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ABSTRACT

This secondary horticulture curriculum guide is one of a set of three designated as the basic core of instruction for horticulture programs in Kansas. Units of instruction are presented in thirteen sections: (1) Orientation and Careers, (2) Leadership and Future Farmers of America, (3) Supervised Occupational Experience Program, (4) Plant Classification, (5) Plant Growth and Development, (6) Nursery Operations, (7) Greenhouses, (8) Floriculture, (9) Landscape Nursery, (10) Lawn Maintenance, (11) Vegetable Production, (12) Fruit Production, and (13) Horticulture Mechanics. Each unit is comprised of the following parts: terminal objective, specific objectives, information sheets, assignment sheets, and unit test. (LRA)

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ED185368

Kansas Vocational Agriculture Education

BASIC CORE CURRICULUM PROJECT

The identification of tasks performed by workers in the horticulture industry, and the preparation of instructional materials for use by teachers of horticulture programs.

HORTICULTURE I

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FOREWORD

This publication is one of a set of three designated as the basic core of instruction for horticulture programs in Kansas. The Kansas Horticulture core units will greatly assist instructors of vocational agriculture to effectively organize, plan and implement an instructional program for secondary students enrolled in vocational agriculture.

The horticulture industry is rapidly increasing in Kansas. Whether students or adults, we are in personal contact with many phases of horticulture in our daily lives. Fresh and processed fruits and vegetables are a part of our every day diets and are products of the horticulture industry. Likewise ornamental trees, shrubs, flowers and lawns are an established part of living as it relates to our homes, cities and highways. Because of this, horticulture offers many challenging opportunities in the tremendous use of horticulture plants for food, aesthetic and utility purposes and for students selecting a horticulture occupation. The student must also receive training through a supervised occupational experience program.

Appreciation is expressed to Dr. James Albracht for directing and coordinating the project, to the teachers who dedicated their time in developing individual units and to the industry specialists who provided the technical assistance in completing the units contained in this publication.

Les Olsen
Education Program Specialist
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ACKNOWLEDGEMENTS

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ORIENTATION AND CAREERS

UNIT 1

ORIENTATION TO VOCATIONAL AGRICULTURE

TERMINAL OBJECTIVE

After completion of this unit, the student will be able to match terms associated with vocational agriculture to the proper definition and discuss the importance of vocational agriculture in his/her future as well as the opportunities for personal development offered by vocational agriculture and FFA. This objective will be considered achieved by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, the student will be able to:

1. Match terms associated with orientation to vocational agriculture to their definition.
2. List three reasons for studying vocational agriculture.
3. List the responsibilities of being a student in vocational agriculture.
4. List four groups of people that vocational agriculture trains and serves.
5. List three activities in which FFA members can participate.
6. Match the proper description and/or activity with the FFA contest.
7. Match the requirements for the various FFA degrees with the degree.
8. List five awards available through the FFA awards program.
9. Explain in writing why vocational agriculture is vocational in nature.
10. Prepare a list of the more important horticulture enterprises in your home community. (Assignment Sheet #1)

ORIENTATION AND CAREERS

UNIT 1

INFORMATION SHEET

I. Terms and Definitions:

A. Vocational agriculture - Training program to teach young people about the science of agriculture and/or agricultural related occupations and to prepare them for furthering their education or entry into the world of work

B. Agriculture - Science of art of cultivating the soil, producing crops, raising livestock, and all other aspects created as these products move from producer to consumer.

C. Agricultural related occupations (Agribusiness) - Those operating units that support production agriculture in such ways as marketing processing, and servicing.

D. Future Farmers of America (FFA) - An organization of national scope for students enrolled in vocational agriculture programs designed to provide training in leadership, citizenship, and cooperation and to compliment the total program.

II. Reasons for studying vocational agriculture

A. Importance of national food supply

B. Awareness of nation's economy

C. Daily use of farm products

D. Understanding of agricultural related business

E. Choice of an occupation

F. Wise usage of our natural resources

(NOTE: The nature of today's agriculture requires that students be trained in the sciences dealing with animals, plants, and soils, as well as principles of breeding, feeding disease, and insect control. In every school, instruction is prepared so that it meets the needs of students. Whatever a student ultimately decides to do, the willingness to accept responsibility and to make decisions based on what he has learned in vocational agriculture will be valuable to him.)

III. Responsibilities of vocational agriculture students

A. Attend classes

B. Carry on a supervised occupational experience program.

(NOTE: It is this aspect of vocational agriculture that makes it vocational in nature. By having a farming program or gaining work experience in an agricultural business, students become acquainted with the world of work and begin to recognize the importance of preparing for a vocation.)

C. Become an active member of the Future Farmers of America.

D. ______________________________ (To be completed by local schools)

INFORMATION SHEET

IV. Groups that vocational agriculture trains and serves

   A. High school students planning to farm

   B. High school students planning to work in agricultural-related occupations

   C. Young adults establishing themselves in farming

   D. Farmers improving their operations

V. FFA activities

   A. FFA meetings

   B. Committee work

   C. Leadership conference

   D. Contests

   E. Livestock shows and fairs

   F. State and national conventions

   G. Parent-Member banquet

   H. Field trips

   I. Local, state, and national awards

VI. Contests for the FFA members

   A. Livestock Judging - Ability to select animals for breeding and marketing purposes

   B. Crops Judging - Ability to identify and judge all types of plants and seeds common to the local community and to Kansas

   C. Land Judging - Ability to identify the various types of soils and land classes and make land use recommendations

   D. Meats Judging - Ability to select meat cuts and evaluate carcasses

   E. Agricultural Newswriting - Ability to perform correct journalism skills

   F. Parliamentary Procedure - Ability to conduct an effective and efficient chapter meeting according to the correct rules of parlimentary procedure

   G. Public Speaking - Ability to write and deliver speeches

   H. FFA Quiz - Ability to answer questions that test one's knowledge of the Future Farmers of America

   I. Agricultural Electrification - Ability to identify electrical equipment and perform simple wiring skills

   J. Agricultural Structures and Environment - Ability to lay out building or structures designed to meet certain specifications

   K. Agricultural Mechanic Skills - Ability to identify tools and perform basic mechanical skills

   L. Farm Power and Machinery - Ability to identify parts and perform basic tasks concerning farm machinery

INFORMATION SHEET

M. Soil and Water Management - Ability to evaluate and understand irrigation systems and conservation practices

N. Dairy Cattle Judging - Ability to evaluate dairy animals

O. Dairy Products Judging - Ability to evaluate dairy products

P. Poultry Judging - Ability to select and evaluate the different classes of poultry including egg production

Q. Entomology - Ability to identify and answer basic questions about different types of insects

R. Horticultural Judging - Ability to identify and judge various classes of horticultural plants

S. Creed Speaking - Ability of freshman to deliver the FFA Creed

VII. FFA degrees that can be earned

A. Greenhand Degree

1. Awarded by the local chapter signifying achievement of the first level of membership

2. Qualifications for the degree

a. Be enrolled in vocational agriculture and have plans for a supervised training program in agriculture

b. Be familiar with the aims and purposes of the FFA

c. Recite the FFA Creed

d. Receive a majority vote from the local chapter members

(NOTE: Star Greenhand - Awarded by the local chapter to the most outstanding Greenhand or freshman student.)

B. Chapter Farmer Degree

1. Awarded by the local chapter signifying achievement of the second level of membership

2. Qualifications for the degree

a. Must have received the Greenhand Degree

b. Must have completed one semester of instruction in vocational agriculture

c. Must have earned at least $50 from a supervised training program or worked 50 hours

(NOTE: Chapter Star Farmer and Star Agribusinessman - Awarded at the local level to the most outstanding member in the chapter in his/her training program area; selected from the Chapter Farmers.)

C. State Farmer Degree

1. Awarded to the top 2% of the FFA members in the state each year.

2. Qualifications for the degree

a. Must have been in the FFA for at least two years

b. Must have earned at least $500 from a supervised training program or worked 600 hours

INFORMATION SHEET

  - c. Must be able to lead a group discussion for at least 40 minutes
  - d. Must participate in activities above the chapter level

(NOTE: District Star Farmer and Star Agribusinessman - Awarded at the district level to the most outstanding member in leadership, scholarship, and supervised agricultural training program; selected from the State Farmers in that district.)

(NOTE: State Star Farmer and Star Agribusinessman - Awarded to the outstanding FFA member in the state in his/her training program area/ must have received the State Farmer Degree.)

D. American Farmer Degree

1. Awarded to the top FFA members in the nation

   (NOTE: 1 in 1,000 is eligible to receive the American Farmer Degree.)

2. Qualifications for the degree

   - a. Must have received the State Farmer Degree
   - b. Must have been an active FFA member for at least 36 months.
   - c. Must have earned at least $1,000 from a supervised training program.

(NOTE: Regional Star Farmer and Star Agribusinessman - Selected from the American Farmers in the four regions from his/her training program area; awarded to four members yearly in the United States.)

(NOTE: Star Farmer and Star Agribusinessman of America:

1. Awarded to the outstanding FFA member in the nation in his/her training program area
2. Must have achieved the American Farmer Degree
3. Awarded annually at the National FFA Convention
4. Qualifications for the award
   - a. Must list career goals
   - b. Must list and describe skills and/or competencies developed through an occupational experience program
   - c. Must describe the managerial responsibilities assumed
   - d. Must provide an annual summary of total hours worked each year and/or income received
   - e. Must itemize investments and other resources accumulated
   - f. Must be recommended by his/her state association

VIII. Awards available on the local, state, and national levels

A. Individual Foundation Awards

1. Agricultural Mechanics
2. Agricultural Electrification
3. Soil, Water, and Air Management

INFORMATION SHEET

4. Crop Production
5. General Livestock Production
6. Beef Production
7. Sheep Production
8. Swine Production
9. Dairy Production
10. Poultry Production
11. Home Improvement
12. Ornamental Horticulture
13. Outdoor Recreation
14. Fish and Wildlife Management
15. Forestry Management
16. Placement in Sales and/or Service
17. Placement in Agricultural Production
18. Placement in Processing
19. FFA Public Speaking
20. Star State Farmer
21. Star State Agribusinessman
22. Star Farmer of America
23. Star Agribusinessman of America

B. Chapter Foundation Awards
   1. Better Chapter
      a. State Level
         1. Superior Awards
         2. Gold Emblem Awards
      b. National Level
         1. Bronze Awards
         2. Silver Awards
         3. Gold Awards
   2. Chapter Safety
      a. State Level - Superior Awards
      b. National Level
         1. Bronze Awards
         2. Silver Awards
         3. Gold Awards
   3. Building Our American Communities
      a. State Level

1. Bronze Awards
2. Silver Awards
3. Gold Awards

b. National Level
1. Bronze Awards
2. Silver Awards
3. Gold Awards

C. Chapter Improvement Awards
1. Membership Achievement Awards
2. State Scrapbook Contest

D. Individual Improvement Awards
1. Livestock Conservation Awards
2. Grass and Grain Record Keeping Awards
3. Kansas Cooperative Council Awards
4. Wildlife Damage Control
5. Acres for Wildlife
6. Kansas Future Farmer Award
7. National FFA Band and Chorus
8. National Talent

E. Scholarships
1. Santa Fe Railway
2. Roy Freeland, Harry Darby Scholarship
3. Hesston Scholarship
4. Charolais Scholarship
5. Hereford Scholarship
6. Angus Scholarship
7. Alpha Gamma Rho Scholarship
8. Horticulture Society Grants

IX. Nature of vocational agriculture
A. Supervised occupational experience programs
1. Actual "hands on" experience program
2. Real life experience
3. Learn by doing

B. Preparing for a vocation

X. Most important horticulture enterprises in your home community (Instructor will supply information.)

ORIENTATION AND CAREERS

UNIT 1

ASSIGNMENT SHEET #1 - List of Important Agricultural Enterprises in Community

Prepare a list of the more important agriculture enterprises in your community. (Discuss this with your instructor after the list is complete.)

ORIENTATION AND CAREERS

UNIT 1

TEST

1. Match terms on the right with their correct definition.

________a. An organization of national scope for students enrolled in vocational agriculture programs designed to provide training in leadership, citizenship, and cooperation, and to compliment the total program.

________b. Those operating units that support production agriculture in such ways as marketing, processing, and servicing.

________c. Science or art of cultivating the soil, producing crops, raising livestock, and all other aspects created as these products move from producer to consumer.

________d. Training program to teach young people about the science of agriculture and/or agricultural related occupations and to prepare them for furthering their education or entry into the world of work.

1. Vocational Agriculture
2. Agriculture
3. Future Farmers of America
4. Agricultural related occupations (Agribusinessman)

2. List three reasons for studying vocational agriculture.

3. List the responsibilities of being a student in vocational agriculture.

4. List four groups of people that vocational agriculture serves and trains.

5. List three activities in which FFA members can participate.

6. Match the contests on the right with the proper descriptions and/or activities on the left.

________a. Identifying vegetables
________b. Land capability classes
________c. Welding
________d. Laying out a building
________e. Wiring
________f. Evaluating carcasses
________g. Conducting business
________h. Insect identification

1. Horticulture judging
2. Livestock Judging
3. Crops Judging
4. Poultry Judging
5. Agricultural Mechanics Contest
6. Parliamentary Procedure
7. Agricultural Electrification Contest

TEST

8. Land Judging
9. Agricultural Structures and Environment Contest
10. Dairy Products Judging Contest
11. Entomology Contest
12. Meats Judging Contest

7. Match the degree on the right with its proper set of requirements by placing the letter which represents that degree in the correct blank.

G = Greenhand

C = Chapter Farmer

S = State Farmer

A = American Farmer

________ a.
1. Awarded by local chapter signifying achievement of the first level of membership.
2. Be enrolled in vocational agriculture.
3. Recite the FFA creed
4. Be familiar with the aims
5. Receive a majority vote from local chapter members

________ b
1. Awarded to top FFA members in the nation
2. Must have received the State Farmer Degree
3. Must have been an active FFA member for at least 36 months
4. Must have earned at least $1,000 from a supervised experience program

________ c.
1. Awarded to top 2% of the FFA members in the state each year
2. Must have been in FFA for at least two years
3. Must have earned at least $500 from a supervised experience program or worked 600 hours
4. Must participate in activities above the chapter level

________ d.
1. Awarded by local chapter signifies achievement of the second level of membership
2. Must have received the degree of Greenhand
3. Must have completed one semester of instruction in vocational agriculture

TEST

4. Must have earned at least $50 from a supervised experience program or worked 50 hours

8. List five individual foundations awards available through the the FFA awards program.

9. Explain in writing why vocational agriculture is vocational in nature.

10. Prepare a list of the more important agricultural enterprises in your community.

(NOTE: If this has not been accomplished prior to the test, ask the instructor when the above activity should be completed.)

ORIENTATION AND CAREERS

UNIT 2

OPPORTUNITIES IN HORTICULTURE

TERMINAL OBJECTIVE

Upon completion of this unit, students will be able to identify general terms that pertain to horticulture and to list factors when considering a job in horticulture. Students will also be able to name the entry level positions in horticulture, and to list job descriptions for various positions. This objective will be considered achieved upon attainment of a score of eighty-five percent or better on the test.

SPECIFIC OBJECTIVES

After completion of this unit, students will be able to:

1. Match terms pertaining to horticulture careers.
2. List four factors one should consider in selecting a job in horticulture.
3. Name at least four entry level positions that are available after two years of training.
4. Name at least eight entry level positions that are available after further training.
5. List at least four tasks that are part of the job descriptions of each of the following: greenhouse worker, nursery worker, garden center worker, assistant groundskeeper, and parks and landscape employee.

ORIENTATIONS AND CAREERS

UNIT 2

INFORMATION SHEET

I. Terms and Definitions:

- A. Horticulture - The production of flowers, fruit, vegetables, and ornamentals.
- B. Ornamentals - A plant that is grown, normally, for its beauty.
- C. Floriculture - The cultivation and management of ornamental and flowering plants.
- D. Pomology - The science and the practice of fruit growing.
- E. Olericulture - The production, processing, and distribution of vegetable crops.
- F. Identification - The naming of plants.
- G. Morphology - The study of the structure of plants.
- H. Classification - The placing of a plant (or group of plants) in categories according to a particular sequence indicating relationship.
- I. Taxonomy - A system of naming and classifying plants in order to identify them.

II. Factors to Consider in Selecting a Job in Horticulture.

- A. What is the nature of the work?
- B. Does the occupation require chiefly mental or physical effort?
- C. Is the work inside or outside work, or both?
- D. What personal qualifications are required for entry into the occupation?
- E. What are the educational and training requirements for the job?
- F. Is there opportunity for doing a variety of jobs?
- G. Are there opportunities for advancement and self-betterment?

III. **Entry-level Jobs in Horticulture with Two Years Training**

- A. Greenhouse Employee
- B. Nursery Employee
- C. Tree Maintenance Employee
- D. Horticultural Processing Employee
- E. Golf Course Employee
- F. Landscape Gardener
- G. Grounds Maintenance Employee
- H. Horticultural Products and Equipment Salesman

I. Retail Floral Worker, Manager, or Owner

IV. Entry-level Jobs in Horticulture with more than two years' training.

A. Greenhouse Assistant Manager
B. Greenhouse Foreman
C. Florist or Flower Grower
D. Nursery Assistant Manager
E. Nursery Foreman
F. Tree Maintenance Foreman
G. Fruit Producer
H. Vegetable Producer
I. Fruit and Vegetable Assistant Manager
J. Fruit and Vegetable Inspector
K. Nursery and Greenhouse Plant Inspector
L. Landscape Foreman
M. Parks System Foreman
N. Garden Center Assistant Manager
O. Garden Center Specialist
P. Golf Course Greens Manager

V. Some Typical Entry-level Job Descriptions.

A. Greenhouse worker

1. Works in an artificially heated glass or plastic greenhouse.
2. Grows either flowers or vegetables or both.
3. Work may include the propagation of trees or ornamental shrubs from seeds or cuttings.
4. Work may include some of the same duties of the nursery worker.
5. Work includes screening, mixing, and sterilizing soil.
6. Fills containers with soil.
7. Sows seeds, starts cuttings, and transplants seedlings and plants.
8. Controls the greenhouse temperature and humidity.
9. Maintains the greenhouse structure and equipment.
10. He should know the names and the culture of the plants with which he works.

B. Nursery Worker

1. Grows seedlings and plants for landscaping, fruit farming, and forest replanting.

2. Works in specialized nurseries, such as fruit trees or small fruit transplants, or ornamental trees and shrubs, or forest replanting materials.
3. Prepares seedbeds, plants seedlings, weeds, cultivates, fertilizes, waters, prunes, and performs other cultural practices such as spraying and grafting.
4. Digs, grades, and packs plants for shipment
5. Cuts, lifts and lays sod.
6. Transplants shrubs and trees.
7. Helps with the maintenance and repair of buildings and equipment.
8. Assists customers in selecting plants for home landscaping.
9. Makes recommendations on maintenance to the customer and may work at a nursery where he will be required to make periodic checks on customers' lawns and to maintain the beauty of the landscape.

C. Garden Center Employee.

1. Performs many jobs, including caring for ornamental plants, moving plants and supplies into selling areas, arranging plants and supplies for display purposes, and selling the various products.
2. Work includes cleaning, stocking, and arranging garden supplies on shelves, counters, and in windows.
3. Cares for ornamental plants by watering, feeding, trimming, spraying and controlling temperatures.
4. Unloads and unpacks supplies as they arrive from wholesalers, loads orders into customers' cars.
5. Gives information to customers on care of plants, care of lawns, plant varieties, and merits of different garden supplies and equipment.

D. Assistant Groundskeeper.

1. Cares for the area surrounding an industry or business, church, school, airport, apartment building, private estate, cemetery, or shopping center.
2. Plants and cares for ornamental plants and lawns.
3. Work involves mowing grass, reseeding, controlling weeds and planting and spraying ornamental plants.
4. Rakes and disposes of leaves and other refuse.
5. Year-around employment is provided through maintenance and repair of walks, drives, and equipment.
6. Work may also involve making minor repairs to building.

E. Parks and Landscape Employee.

1. Performs the work necessary for proper maintenance of landscapes and park areas.
2. Work includes mowing grass, trimming the edges of walks and driveways, planting, pruning, and caring for trees, shrubs, hedges, lawns, and flower beds; controlling insects, diseases, and weeds; and caring for the soil.
3. Work may also include such jobs as removing trash, or snow, maintenance of swimming pools, care of boating facilities, general maintenance of buildings and equipment, and repair of roadways and drives.

ORIENTATION AND CAREERS

UNIT 2

TEST

1. Match:

______a. Classification
______b. Olericulture
______c. Taxonomy
______d. Horticulture
______e. Floriculture
______f. Identification
______g. Ornamentals
______h. Pomology
______i. Morphology

1. A system of naming and classifying plants in order to identify them.
2. The naming of plants.
3. The cultivation and management of ornamental and flowering plants.
4. The production of flowers, fruit, vegetables, and ornamentals.
5. The science and the practice of fruit growing.
6. A plant that is grown, normally for its beauty.
7. The production, processing, and distribution of vegetable crops.
8. The placing of a plant (or group of plants) in categories according to a particular sequence indicating relationship.
9. The study of the structure of plants.

2. List four factors one should consider in selecting a job in horticulture.

3. List at least four entry level positions that are available after two years of training.

4. List at least eight entry level positions that are available after further training.

5. List at least four descriptions for each of the following jobs:

a. Greenhouse Worker
b. Nursery Worker
c. Garden Center Employee
d. Assistant Groundskeeper
e. Parks and Landscape Employee

LEADERSHIP AND FFA

UNIT 1

INTRODUCTION TO THE FFA

TERMINAL OBJECTIVE

Upon completion of this unit, the student will be able to discuss the organization and operation of a local chapter and describe the purposes of the organization. The student will also be able to write a brief history and discuss the requirements for membership. This objective will be considered achieved by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, the student will be able to:

1. Write a short paragraph describing major events in the history of the FFA.
2. List the requirements for membership in the FFA.
3. Select from a list the types of membership in the FFA.
4. Name the official FFA colors.
5. Write the FFA motto.
6. Recite the FFA creed.
7. List the five symbols which make up the FFA emblem and the meaning of each.
8. Select from a list of terms the four degrees of active membership.
9. Name the six main offices of the local chapter and one duty of each.
10. Name the officers of the state association.
11. Identify the symbols of the FFA officers' station.
12. List four essentials of a good chapter.
13. Select from a list the primary aim of the FFA.
14. List four of the specific purposes of the FFA.
15. Name the seven FFA districts in Kansas.

LEADERSHIP AND FFA

UNIT 1

INFORMATION SHEET

I. Brief history of the FFA

- A. Organized nationally in 1928 at Kansas City, Missouri.
- B. Kansas - the 16th state chartered; chartered in 1929.
- C. National convention held each fall at Kansas City, Missouri during the time of the American Royal.
- D. Kansas Association FFA State Convention - held each spring at Kansas State University.
- E. State advisor - Mr. Les Olsen
- F. State executive secretary - Mr. Robert Broeckelman
- G. 500,385 members in 7,838 chapters throughout 50 states and Puerto Rico.
- H. 6,886 members in 152 Kansas chapters.
- I. Admitted girls into the organization in 1969.
- J. Official song - "Hail the FFA"
- K. Seven FFA districts in Kansas - Southeast, East Central, Northeast, North Central, Northwest, South Central, Southwest.
- L. State FFA Leadership Camp - held during July at Rock Springs Ranch near Junction City.

II. Requirement for membership

- A. 14-21 years of age
- B. Enrolled in vocational agriculture
- C. Be in good standing with local chapter.
- D. (Local requirements)

III. Types of membership in the FFA

- A. Active
- B. Honorary
- C. Alumni
- D. Collegiate

IV. Official FFA colors - National blue and corn gold

V. FFA motto

Learning to do, Doing to learn
Earning to live, Living to serve

VI. The FFA Creed

I believe in the future of farming, with a faith born not of words but of deeds--achievements won by the present and past generations of agriculturists, in the promise of better days through better ways even as the better things we now enjoy have come to us from the struggles of former years.

I believe that to live and work on a good farm, or to be engaged in other agricultural pursuit, is pleasant as well as challenging; for I know the joys and discomforts of agricultural life and hold an inborn fondness for those associations which, even in hours of discouragement, I cannot deny.

I believe in leadership from ourselves and respect from others. I believe in my own ability to work efficiently and think clearly, with such knowledge and skill as I can secure, and in the ability of progressive agriculturists to serve our own and the public interest in producing and marketing the product of our toil.

I believe in less dependence on begging and more power in bargaining; in the life abundant and enough honest wealth to help make it so--for others as well as myself; in less need for charity and more of it when needed; in being happy myself and playing square with those whose happiness depends upon me.

I believe that rural America can and will hold true to the best traditions of our national life and that I can exert an influence in my home and community which will stand solid for my part in that inspiring task.

The creed was written by E.M. Tiffany, and adopted at the 3rd National Convention of the FFA. Revised at the 38th Convention.

VII. Symbols of the FFA emblem

A. Owl - Symbolic of wisdom and knowledge

B. Plow - Symbolic of labor and tillage of the soil

C. Rising Sun - Symbolic of a new day (era) in agriculture.

D. Cross-section of the ear of corn - Symbolic of common agricultural interests

E. American Eagle - Symbolic of the national scope of the organization

VIII. Degrees of active membership

A. Greenhand

B. Chapter Farmer

C. State Farmer

D. American Farmer

IX. Offices of the local chapter and duties

(NOTE: Every chapter should at least have the first seven offices.)

A. President - Presides over all meetings.

B. Vice-President - Assists president and directs all committee work.

C. Secretary - Keeps minutes of all meetings.

D. Treasurer - Keeps financial records

E. Reporter - Reports chapter news

INFORMATION SHEET

F. Advisor - Advises FFA members on all matters relating to the chapter

G. Sentinel - Assists president in maintaining order

H. Historian - Keeps chapter scrapbook

I. Chaplain - Takes charge of religious exercises during meetings, banquets, or other occasions.

J. Parliamentarian - Informs the members on correct parliamentary procedure

X. State FFA officers (to be completed by teacher)

A. President -

B. Vice-President -

C. Secretary -

D. Treasurer -

E. Reporter -

F. Sentinel -

G. Advisor -

H. Executive Secretary -

XI. Symbols of FFA officers' stations (TM 1)

A. Rising sun - President

B. Plow - Vice-President

C. Ear of corn - Secretary

D. Bust of Washington - Treasurer

E. American Flag - Reporter

F. Shield of Friendship - Sentinel

G. Owl - Advisor

XII. Essentials of a good chapter

A. Knowledge of the FFA on the part of every member

B. Capable officers and leaders

C. Responsibilities shared by all members in chapter activities

D. A challenging program of activities

E. Adequate financing for chapter activities

F. Proper paraphernalia, equipment and records

G. Well planned, regularly held chapter leaders

H. Support by school officials and community leaders

XIII. Primary aim of FFA - Development of agricultural leadership, cooperation and citizenship

XIV. Specific purposes of FFA

INFORMATION SHEET

A. To develop competent, aggressive, rural, and agricultural leadership

B. To create and nurture a love of country life

C. To strengthen the confidence of students of vocational agriculture in themselves and their work

D. To create more interest in the intelligent choice of agricultural occupations

E. To encourage members to improve the farm home and its surroundings

F. To encourage members in the development of individual farming programs and establishment in agricultural careers

G. To participate in worthy undertakings for the improvement of agriculture

H. To develop character, train for useful citizenship, and foster patriotism

I. To participate in cooperative effort

J. To encourage and practice thrift

K. To encourage improvement in scholarship

L. To provide and encourage the development of organized rural recreational activities

XV. Dues (completed by the instructor)

A. National - $______________________

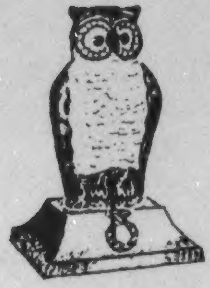
B. State - $______________________

C. District - $______________________

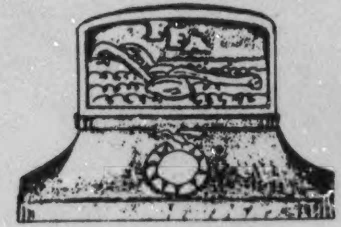
D. Local - $______________________

(NOTE: National dues include subscription to the National Future Farmer Magazine and State dues include a subscription to the Kansas Future Farmer Magazine.)

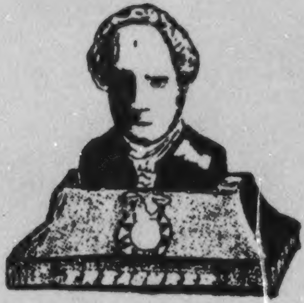
Symbols of Officers' Stations



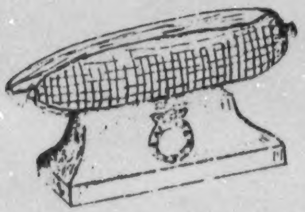
Advisor



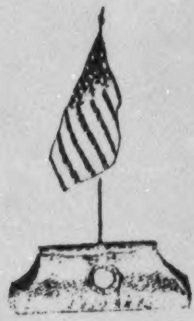
Vice-President



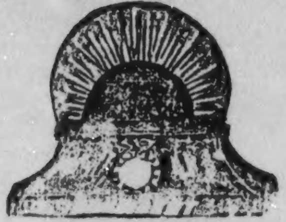
Treasurer



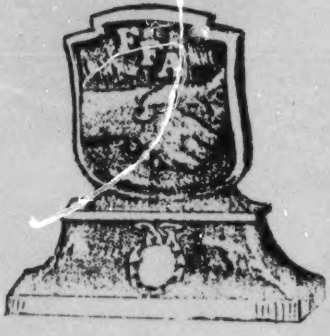
Secretary



Reporter



President



Sentinel

LEADERSHIP AND FFA

UNIT 1

TEST

1. Write a short paragraph describing major events in the history of the Future Farmers of America.

2. List the requirements for membership in the FFA.

3. Select from the list below the types of membership in the FFA by placing an "X" in the correct blank.

   ______a. Active
   ______b. Associate
   ______c. Collegiate
   ______d. Inactive
   ______e. Honorary
   ______f. Regular
   ______g. Chapter Farmer
   ______h. Alumni

4. The official FFA colors are ________________ and ________________.

5. Write the FFA motto.

6. Recite the FFA creed.

   (NOTE: If this activity has not been accomplished prior to the test, ask the instructor when it should be completed.)

7. List the five symbols which make up the FFA emblem and the meaning of each.

8. Select from a list of terms below the four degrees of active membership by placing an "X" in the correct blanks.

   ______a. Honorary
   ______b. Chapter Farmer
   ______c. Alumni
   ______d. Associate
   ______e. Greenhand
   ______f. American Farmer

TEST

______g. Regular farmer

______h. State Farmer

9. Name the seven main officers of the local chapter and one duty of each.

10. Name the following officers of the state association.

a. President -

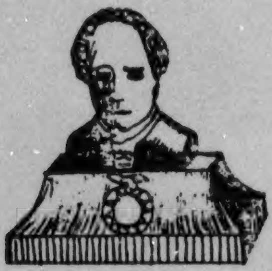
b. Secretary -

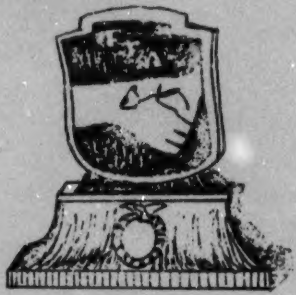
c. Advisor -

d. Reporter -

e. Executive Secretary -

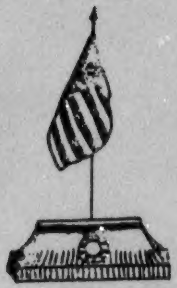
11. Identify the FFA officers' symbols from the following diagrams.

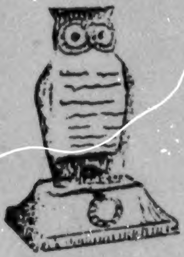




a.______________________

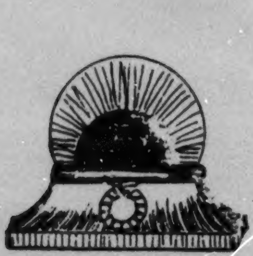
b.______________________

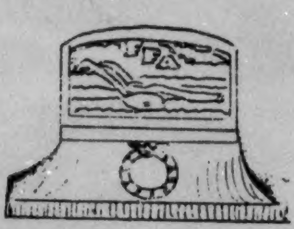




c.______________________

d.______________________

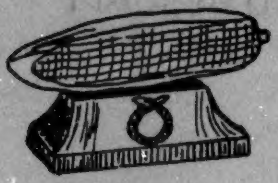




e.______________________

f.______________________

TEST



g. ________________

12. List four essentials of a good chapter.

13. Underline the primary aim of the Future Farmers of America.

    a. The development of leadership
    b. The maturing of the individual
    c. The development of self-confidence
    d. The development of agricultural leadership, cooperation, and citizenship.

14. List four of the specific purposes of FFA.

15. List the seven FFA districts in Kansas.

LEADERSHIP AND FFA

UNIT 2

DUTIES AND RESPONSIBILITIES OF FFA MEMBERS

TERMINAL OBJECTIVE

Upon completion of this unit, the student will be able to discuss the duties and responsibilities of being an FFA member. The student will be able to organize the order of business for a meeting and discuss the areas of the program of activities. This objective will be considered achieved by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, the student will be able to:

1. list the order of business for a FFA meeting.
2. List six items that constitute a good FFA meeting.
3. Identify the location of the FFA officers' stations during a FFA meeting given a diagram of the meeting room.
4. List five areas in the program of activities.
5. List the purposes for which committees are formed.
6. Discuss in a paragraph the proper use of the FFA Jacket or blazer.
7. List six items in the code of ethics.
8. List five leadership activities that would apply to the FFA chapter and community.
9. List three purposes of the Future Farmer Supply Service as related to the local chapter.
10. Describe two activities in which a local chapter can participate or sponsor during national FFA week.
11. Complete checklist on successful chapter operation. (Assignment Sheet #1)

LEADERSHIP AND FFA

UNIT 2

INFORMATION SHEET

I. Order of business for FFA meetings.
    A. Opening ceremony
    B. Minutes of the previous meeting
    C. Orders of the day
    D. Officers' reports
    E. Reports on chapter program of activities
    F. Special features
    G. Unfinished business
    H. Committees' reports
        1. Standing
        2. Special
    I. New business
    J. Degree and installation ceremonies

       (NOTE: Used only when new members are initiated, when Greenhands are raised to the Chapter Farmer degree, or when officers are installed.)
    K. Closing ceremony
    L. Entertainment, recreation, refreshments

II. Items that constitute a good FFA meeting
    A. Effective use of an executive committee to assure careful planning in advance of the meeting time
    B. Starts and closes on time
    C. Proceeds according to an established order of business
    D. Conducted according to accepted parliamentary procedure
    E. Includes well-prepared committees', secretary's, and treasurer's reports.
    F. Shows that each officer is familiar with his or her duties and responsibilities
    G. Commands the interest and attention of all members
    H. Provides for maximum member participation and develops the cooperative attitude
    I. Includes business, entertainment features, and refreshments
    J. Moves along with "snap" thus preventing monotony and the wasting of time
    K. Proceeds with a minimum of active participation by the Advisor

III. Location of FFA officers' stations in the meeting room (TM 1)

INFORMATION SHEET

IV. Areas covered in program of activities

- A. Supervised agricultural occupations experience
- B. Cooperation
- C. Community service
- D. Leadership
- E. Earnings, savings, and investments
- F. Conduct of meetings
- G. Scholarship
- H. Recreation
- I. Public relations
- J. State and national activities
- K. Alumni Relations

(NOTE: Chapter executive committee should appoint each person to a committee on the program of activities.)

V. Purposes for which committees are formed

- A. To reach chapter goals
  - 1. Superior chapter award
  - 2. Gold emblem chapter award
  - 3. National chapter award
    - a. Bronze emblem chapter
    - b. Silver emblem chapter
    - c. Gold emblem chapter
- B. To accomplish specific work assignments
- C. To deal with specific problems
- D. To research and make recommendations about new areas of interest

VI. Proper wear of FFA jacket or blazer

- A. The jacket or blazer should only be worn by persons who are members of the organization.
- B. It should be kept clean and neat at all times.
- C. The jacket should have only a large emblem on the back and a small emblem on the front; the name of the State Association and the name of the local chapter on the back; and the name of the individual and one office or honor on the front.
- D. For the most attractive appearance, the jacket should be worn on official occasions with the zipper fastened to the top. The collar should be turned down and cuffs in place and buttoned.

INFORMATION SHEET

E. The jacket or blazer should be worn by officers and members on all official FFA occasions, as well as other occasions where the chapter is represented. It may be worn to school and other appropriate places.

F. The jacket or blazer should only be worn to places that are appropriate for members to visit.

G. The jacket should be worn by contestants in the National Public Speaking Contest, and at other occasions when FFA members are receiving FFA awards.

H. School letters and insignia of other organizations should not be attached to or worn on the jacket.

I. The jacket or blazer should not be worn with garments bearing the insignia of other organizations.

J. When the jacket becomes too faded and worn to wear in public, it should be discarded or the emblem and lettering should be removed.

K. The emblems and lettering should be removed if the jacket or blazer is given or sold to a non-member

L. A member always acts like a lady or gentleman when wearing the jacket or blazer.

M. Members should refrain from smoking while wearing the FFA jacket or blazer or when officially representing the organization.

N. All chapter degree, officer, and award medals should be worn beneath the name on the right side of the jacket, with the exception that a single State Farmer charm and American Farmer key should be worn above the name or attached to a standard key chain. No more than three medals should be worn on the jacket; these should represent the highest degree earned, the highest office held, and highest award earned by the member.

VII. Code of ethics for FFA members.

A. Dress neatly and appropriately for the occasion.

B. Show respect for the rights of others and be courteous at all times

C. Be honest and do not take unfair advantage of others.

D. Respect property of others.

E. Refrain from loud, boisterous talk, swearing, and horseplay.

F. Demonstrate sportsmanship in the show ring, judging contests, and meetings.

G. Attend meetings promptly and respect the opinions of others in discussion.

H. Take pride in the FFA organization, activities, farming programs, exhibits, and in the occupation of farming and ranching.

I. Share with others experiences and knowledge gained by attending national and state meetings.

INFORMATION SHEET

VIII. Leadership activities

A. Provide special training for newly elected officers.

B. Elect auxiliary officers

C. Conduct chapter public speaking contest

D. Provide experience in parliamentary procedure.

E. Provide experience in conducting meetings.

F. Participate in a chapter leadership training school.

G. Send members to state and district conventions and/or activities

H. Encourage sending president to FFA National Leadership Conference

I. Provide committee work

(NOTE: Each member should be assigned to a standing committee)

J. Assist members to apply for the higher degrees.

K. Encourage participation in school activities that involve leadership.

L. Encourage participation in community activities.

IX. Purposes of Future Farmer Supply Service

A. Supplies all official FFA merchandise

B. Insures uniformity in official FFA merchandise

C. Provides high-quality official merchandise

X. National FFA Week activities

A. Radio and TV programs

B. FFA Week articles in newspapers

C. School assembly

D. Civic club program

E. Parent and child banquet

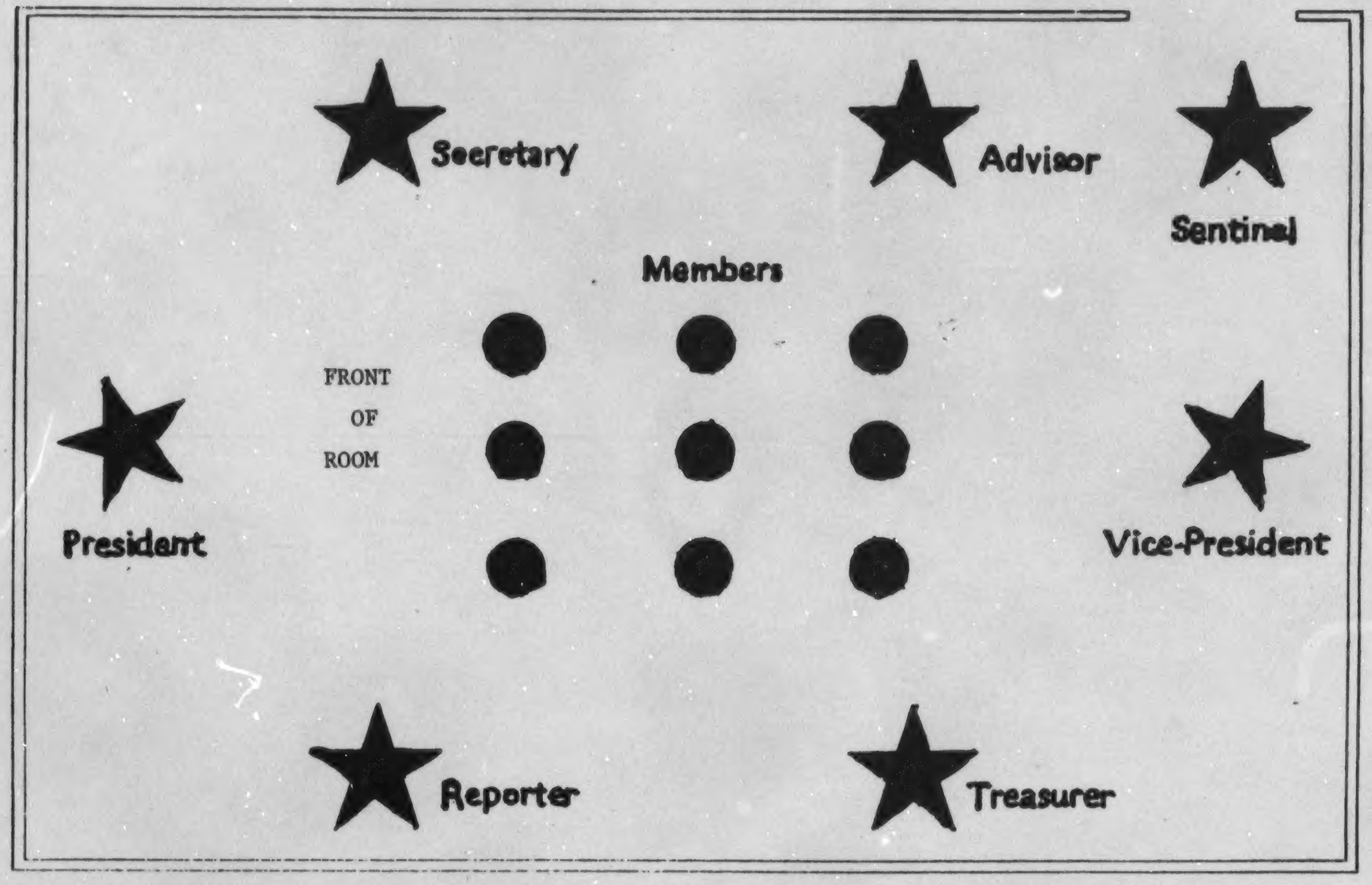
F. Posters displayed around town

G. Attend church as a group

H. Window displays

I. Others that the chapter approves

Room Arrangement for FFA Meeting


Secretary
Advisor
Sentinal
Members
FRONT
OF
ROOM
President
Vice-President
Reporter
Treasurer

ASSIGNMENT SHEET #1 : Checklist on Successful Chapter Operations.

Each member should complete the checklist evaluating chapter cooperation. Answer each question yes or no.

______1. Are the officers selected through a nominating committee on the basis of special qualifications?________Do they meet frequently to plan work and receive assistance?

______2. Are school authorities and others concerned consulted and kept informed on the activities of the chapter?

______3. Does the chapter have a written program of activities formulated by the members?_______Was last year's program completed?

______4. Is there a committee functioning on each division of the present program of activities?

______5. Does the chapter have a written budget based primarily on the program of activities and a sound plan developed for securing the necessary funds with which to operate?

______6. Is the expenditure of chapter funds properly safeguarded?

______7. Do a high percentage of members get experience in the work of the chapter and do they have definite responsibilities that contribute to its success or failure?

______8. Does the chapter possess the standard meeting equipment and is it properly mounted and protected?

______9. Has a satisfactory system of chapter records and reports been developed?

_____10. Is at least one planned meeting held each month when sufficient time is available to take care of all chapter business?________ Is the program for each chapter meeting posted in advance? _______Is accepted parliamentary procedure followed?

_____11. Does the chapter name an executive committee with power to act for the chapter when necessary?

_____12. Do all of the students enrolled in vocational agriculture belong to the chapter? Are qualified members advanced systematically to higher degrees of membership?

_____13. Does the chapter have over ninety percent of its members in attendance at regular meetings?

_____14. Do a high percentage of members know what they should about FFA?________ Is systematic, continuous leadership training given to all members starting with them as Greenhands?

LEADERSHIP AND FFA

UNIT 2

TEST

1. List the order of business for a FFA meeting.

2. List six items that constitute a good FFA meeting.

3. Identify the location of the FFA officers' stations for a FFA meeting by stating the correct office in the blanks provided.

a. ______________________________

b. ______________________________

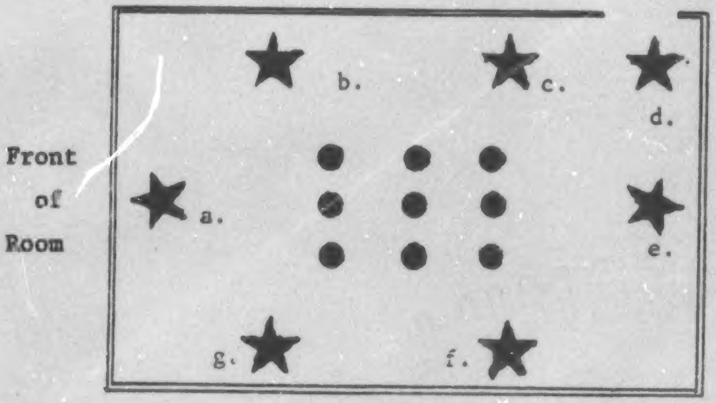
c. ______________________________

d. ______________________________

e. ______________________________

f. ______________________________

g. ______________________________



4. List five areas of the program of activities.

5. List the purposes for which committees are formed.

TEST

6. Discuss in a short paragraph the proper use of the FFA jacket or blazer.

7. List six items in the code of ethics.

8. List five leadership activities that would apply to the FFA chapter and community.

9. List three purposes of the Future Farmers Supply Service as related to the local chapter.

10. Describe briefly two activities that a local chapter can participate or sponsor during National FFA Week.

11. Complete checklist on successful chapter operation

    (NOTE: If this has not been accomplished prior to the test, ask the the instructor when the above activity should be completed.)

LEADERSHIP AND FFA

UNIT 3

PARLIAMENTARY PROCEDURE AND PUBLIC SPEAKING

TERMINAL OBJECTIVES

Upon completion of this unit, the student will be able to apply correct parliamentary procedure in a meeting situation for all offices and as a member. The student will also be able to write and deliver a speech over a topic of his/her choice. This objective will be achieved through actual demonstration and by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, the student will be able to:

1. List two principles upon which parliamentary procedure is based.
2. Select from a list three characteristics of a good chairman.
3. Match types of motions with the appropriate definition.
4. Write the characteristics of the kinds of motions used in conducting a meeting.
5. List three purposes for making a speech.
6. Write the outline that most speeches follow.
7. List the three "ups" of speech delivery.
8. List three different speech contests in which FFA members may participate.
9. Demonstrate the ability to:
    a. Use parliamentary procedure correctly.
    b. Write and deliver a speech two or three minutes in length.

PARLIAMENTARY PROCEDURE AND PUBLIC SPEAKING
UNIT 3

INFORMATION SHEET

I. Principles upon which parliamentary procedure is based

A. The right of the majority to rule

B. The right of the minority to be heard and protected

II. Characteristics of a good chairman

A. Be impartial

B. Inspire confidence in the members

C. Provide leadership

III. Types of motions (Transparency 1)

A. Main motion

1. Main idea before the meeting

2. Only one main motion before the meeting

B. Privileged Motion

1. Does not relate to pending questions

2. Has priority overall other motions, so must be acted upon at once

C. Subsidiary Motion

1. Motion applied to a pending motion to help dispose of that motion

2. Must be decided before continuing with the pending question

D. Incidental Motion

1. Arise out of a pending motion

2. Must be decided before continuing with pending question

IV. Table of motions and rules that apply to motions

V. Purposes for making a speech

A. To inform

B. To entertain

C. To persuade

INFORMATION SHEET

VI. Speech outline

  A. Introduction

  B. Discussion

  C. Conclusion

VII. Three "ups" of speech delivery

  A. Stand up (avoid leaning on podium)

  B. Speak up

  C. Shut up (short conclusion)

VIII. FFA Speeches

  A. Public Speaking

    1. Senior Division

      a. To qualify for State and National competition speech topic must be

        1) of an agricultural character (nature) and of general interest to the public

        2) a minimum of six minutes long and a maximum of eight minutes long

(NOTE: There are some variations in district speech contest. The scorecard included is the National FFA Speech scorecard which is used in the state contest. Transparency 2)

      b. An additional five minutes will be allowed for questions relating to the speech

    2. Junior, Sophomore, Freshman divisions

      a. District level contests

      b. Rules vary among districts

  B. Extemporaneous Speaking

    1. Contestant is given 20 minutes to prepare a 3-5 minute speech from a list of topics

    2. Rules may vary among districts

    3. State competition held during the State High School Agricultural and Agricultural Mechanics contests in Manhattan

C. Greenhand Creed Speaking

1. Contestant delivers creed from memory
2. Contestant answers questions from judges
3. Rules may slightly vary among districts
4. State competition held during the State convention

(NOTE: More information on these contests are found in the last edition of Kansas FFA Activities and Awards Opportunities or by contacting the State Office.)

Official Scorecard - Parliamentary Procedure

Score	Abilities Demonstrated	S	D	A	VOTE	Team Score
	Call to order					
20	Poise and personal appearance of presiding officer and manner displayed (1)					
40	Poise, appearance, and manner displayed by team					
10	Grammar and sentence structure (2)					
20	General effect and the use of realistic measures					
10	Secretary's minutes (used in case of tie)					
20	Effective use of debate					
RANKING MOTIONS (Ranked according to precedence)						
A	PRIVILEGED MOTIONS	S	D	A	VOTE	
10	To fix time to adjourn (4)	Y	N	(7)	M	
10	To adjourn (5)	Y	N	N	M	
10	To take a recess (6)	Y	N	(7)	M	
10	To raise a question or privilege	N	N	N	(8)	
10	To pass the gavel	N	N	N		
B	SUBSIDIARY MOTIONS					
10	To lay on the table	Y	N	N	M	
10	To call for the previous question	Y	N	N	2/3	
10	To limit or extend time of debate	Y	N	(7)	2/3	
10	To postpone definitely (to certain time)	Y	Y	Y	M	
10	To commit or refer	Y	Y	Y	M	
10	To amend proposed amendment	Y	(9)	N	M	
10	To amend	Y	(9)	Y	M	
10	To postpone indefinitely	Y	Y	N	M	
C	MAIN MOTIONS					
30	Main motion (to introduce business)	Y	Y	Y	M	
NON-RANKING MOTIONS						
A	INCIDENTAL MOTIONS					
10	To raise a point of order	N	N	N	(10)	
10	To appeal from the decision of chair	Y	(11)	N	M	
10	To suspend the rules	Y	N	N	2/3	
10	To divide the question	(12)	N	Y	M	
10	To call for a division of house	N	N	N	(13)	
10	To rise to a parliamentary inquiry	N	N	N	N	
10	To rise to request information	N	N	N	N	
10	To withdraw a motion	N	N	N	N	
10	To provide manner of voting	Y	N	Y	Y	
B	UNCLASSIFIED MOTIONS					
10	To take from the table	Y	N	N	M	
10	To reconsider	Y	(14)	N	M	
30	Debate (5 points each for 6 times debate is used)					
20	Response to judge's questioning (state contest only)					
120	Parliamentary procedure quiz (20 questions)					
560	FINAL SCORE					

"D"--DEBATABLE; "A"--AMENDABLE; "M"--MAJORITY VOTE;
"Y"--Yes; "N"--NO

NOTES Pertaining to Specific Items on Official Scorecard

(1) Also includes proper use of gavel.
(2) Means correct English, clear, concise, direct, and well-phrased.
(3) Omit.
(4) Is a privileged motion only if made while another motion is pending, and in an assembly that has made no provision for meeting on the same or next day; otherwise, it is a main motion. The answers apply to the privileged motion.
(5) When unqualified, is always a privileged motion except when effect would be to disband the group permanently. The answers apply to the privileged motion, not to motion to adjourn.
(6) Is a privileged motion if made when other business is pending; otherwise, is a main motion. Answers apply to the privileged motion.
(7) Can be amended as to time.
(8) Is usually disposed by chair, without vote.
(9) Can be debated only when the question being amended is debatable.
(10) Is usually decided by chair, without calling for a vote
(11) Cannot be debated if made during a division of the assembly, or when the pending question is undebatable. Cannot be debated when it applies to indecorum, transgression of the rules of speaking, or to priority of business.
(12) The question must be divided at the request of a single member, (which request can be made when another has the floor), provided the resolutions relate to different subjects which are independent of each other.
(13) When a division is called for, the chair proceeds to take the vote again by rising. No vote is taken on whether a division shall be made, i.e., on whether a standing vote shall be taken.
(14) Debatable when the question to be reconsidered is debatable.

(NOTE: The guide used to make the scoresheet was: "Roberts Rules of Order," and "A Guide to Parliamentary Practices" by Melvin Henderson and Herbert J. Rucker of the University of Illinois.)

HORTI SB U3-9

National Public Speaking Contest ***Judges' Score Sheet***

PART I. FOR SCORING CONTENT AND COMPOSITION

Items To Be Scored	Points Allowed	Points Awarded Contestant												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Content of Manuscript	200													
Composition of Manuscript	100													
Score on Written Production	300													

PART II. FOR SCORING DELIVERY OF THE PRODUCTION

Items To Be Scored	Points Allowed	Points Awarded Contestant												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Voice	100													
Stage Presence	100													
Power of Expression	200													
Response to Questions	200													
General Effect	100													
Score on Delivery	700													

PART III. FOR COMPUTING THE RESULTS OF THE CONTEST

Items To Be Scored	Points Allowed	Points Awarded Contestant												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Score on Written Production	300													
Score on Delivery	700													
TOTALS	1000													
*Less Overtime Deductions, for each minute or major fraction thereof	20													
*Less Undertime Deductions, for each minute or major fraction thereof	20													
GRAND TOTALS														
Numerical or Final Placing of Contestants														

*From the Timekeeper's record.

Awards

Plaques will be awarded to the national contestants by the national organization of Future Farmers of America. The Future Farmers of America Foundation, Inc., will give cash awards as follows:

1st place	$300.00
2nd place	275.00
3rd place	250.00
4th place	225.00

Travel Expenses

A total of $350.00 is provided by the FFA Foundation to assist the contestants on the expenses incurred in making the trip to Kansas City to participate in the national contest. This amount will be prorated on the basis of the distance traveled by each contestant from his State Capital to Kansas City.

The Bibliography

All contestants in the FFA Public Speaking Contest should give credit to others where any direct quotes, phrases, or special dates are used in the manuscript, in order not to be guilty of plagiarism. The Boards of National Officers and Directors of the FFA at the October, 1960, meeting in Kansas City, Missouri, adopted the following:

A bibliography MUST be included as part of the public speaker's manuscript, and direct quotes from any other source of information must be marked in "quotes" on the manuscript and be identified in the bibliography. Failure to do so will automatically disquality a contestant. This applies to *all* contests above the local level.

(Factual information and material pertaining to agriculture is available from the United States Department of Agriculture, Washington, D.C. 20250; State Colleges and Experiment Stations; or the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.)

Explanation of Score Sheet Points

Part I — For Scoring Contest and Composition

1. *Content of the manuscript* includes:
   Importance and appropriateness of the subject
   Suitability of the material used
   Accuracy of the statements included
   Evidence of purpose
   Completeness and accuracy of bibliography

2. *Composition of the manuscript* includes:
   Organization of the content
   Unity of thought
   Logical development
   Language used
   Sentence structure
   Accomplishment of purpose — conclusions

Part II — For Scoring Delivery of Production

1. *Voice* includes:
   - Quality
   - Pitch
   - Articulation
   - Pronunciation
   - Force

2. *Stage presence* includes:
   - Personal appearance
   - Poise and body posture
   - Attitude
   - Confidence
   - Personality
   - Ease before audience

3. *Power of expression* includes:
   - Fluency
   - Emphasis
   - Directness
   - Sincerity
   - Communicative ability
   - Conveyance of thought and meaning

4. *Response to questions* includes:
   *Ability to satisfactorily answer the questions on the speech which are asked by the judges indicating originality, familiarity with subject, and ability to think quickly

5. *General effect* includes:
   Extent to which the speech was interesting, understandable, convincing, pleasing and held attention

---

*NOTE: Judges should meet prior to the contest to prepare and clarify the questions to be asked.

Judge's Score Sheet –
Extemporaneous Speaking Contest

		Order of Speaking									
Names or Code No. of Contestants											
	Points Allowed	Points Awarded Contestants									
Knowledge of Subject	200										
Organization of Material	100										
Power of Expression	200										
Voice	100										
Stage Presence	100										
General Effect	100										
Response to Questions	200										
TOTAL POINTS (Gross)	1000										
Less Time Deductions	1 pt./ second										
Total Points (Net)											
Rank of Contestant											

The final ranking sheet included with the rules shall be used to summarize judges' score sheets

Explanation of Score Sheet Points

1. Knowledge of Subject includes:
   Importance and appropriateness of the subject
   Suitability of the material used
   Accuracy of the statements included
   Evidence of purpose

2. Organization of Material includes:
   Organization of the content
   Unit of thought
   Logical development
   Language used
   Sentence structure
   Accomplishment of purpose - conclusions

3. Voice includes:
   Quality
   Pitch
   Articulation
   Pronunciation
   Force

4. Stage presence includes:
   Personal appearance
   Poise and body posture
   Attitude
   Confidence
   Personality
   Ease before audience

5. Power of expression includes:
   Fluency
   Emphasis
   Directness
   Sincerity
   Communicative ability
   Conveyance of thought and meaning

6. General effect includes:
   Extent to which the speech was interesting, understandable convincing, pleasing, and held attention.

6. Responses to questions include:
   *Ability to answer the questions on the speech which are asked by the judges indicating originality, familiarity with subject, and ability to think quickly.

*NOTE: Judges should meet prior to the contest to prepare and clarify the questions to be asked.

PARLIAMENTARY PROCEDURE AND PUBLIC SPEAKING

UNIT 3

TEST

1. List two principles upon which parliamentary procedure is based.

   a.

   b.

2. List three characteristics of a good chairman.

   a.

   b.

   c.

3. Match the types of motions with the appropriate definition.

_____a. To end meeting	1. Main motion
_____b. To close debate	2. Amendment
_____c. Main idea before the group	3. Adjournment
_____d. To change the main idea	4. To reconsider
_____e. Used when the chair has made an error	5. Point of order

4. Write the characteristics of motions by filling in the blanks in the following table.

	Second Required	Debatable	Vote Required	Amendable
a. Main motion				
b. Amendment				
c. Adjournment				
d. Lay on table				
e. Point of order				

5. List three purposes for making a speech.

   a.

   b.

   c.

6. Write the outline form that most speeches follow.

   a.

   b.

   c.

7. List the three "ups" of speech delivery.

   a.

   b.

   c.

8. List three speech contests in which FFA members may participate.

   a.

   b.

   c.

9. Demonstrate the ability to:

   a. Use parliamentary procedure correctly.

   b. Write and deliver a two to three minute speech.

SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAM

UNIT 1

PLANNING AND IMPLEMENTING THE SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAM

TERMINAL OBJECTIVE

Upon completion of this unit, the student will be able to select a project from the various types available, establish goals for his/her three years in Horticulture and set ways and means for reaching those goals. This objective will be considered achieved by actual demonstration and by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, the student will be able to:

1. Describe the four types of supervised occupational experience programs.
2. List five reasons for having a supervised occupational experience program.
3. List three sources of securing horticulture type projects.
4. Discuss the preparation necessary before securing a horticulture project.
5. Select from a list the requirements for the state farmer degree.

SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAM

UNIT 1

INFORMATION SHEET

I. Types of supervised Horticulture programs
   A. Supervised Horticulture program
      1. Have horticulture program projects
      2. Have horticulture production occupational objective
   B. Cooperative Occupational Experience Program
      1. Have non-production occupational objective
      2. Have on-the-job training program
   C. Horticulture Occupation Training
      1. Have either production or non-production occupational objective
      2. Facilities provided by the school

         Example: Greenhouse
   D. Horticulture Placement
      1. Production or non-production objective
      2. Placed in real life situation for certain length of time for training.

         (NOTE: Minimum training time is 450 hours)

II. Reasons for having a program
   A. Learn responsibility
   B. Gain experience
   C. Earn money
   D. Develop management abilities
   E. Prepare for a career
   F. Learn record keeping
   G. Learn new skills
   H. Establishment in Horticulture

III. Sources of projects
   A. Other students in FFA chapter
   B. Greenhouse operators
   C. Nursery operators

IV. Preparation for the Project
   A. Place of project
   B. Necessary equipment

INFORMATION SHEET

- C. Parent, student, teacher conference
- D. Material needed
- E. Financing
  - 1. Student
  - 2. Parents
  - 3. Banks
  - 4. Farm credit agencies

V. Requirements for State Farmer Degree

- A. Active member of FFA for two years
- B. Two years of instruction in Agriculture
- C. Have received the chapter farmer degree
- D. Incoming seniors to out of school FFA member eligible
- E. Outstanding program of supervised horticulture
- F. Have a satisfactory scholastic record
- G. Evidence of leadership and cooperation
- H. 600 accumulated hours in supervised training
- I. Served as an officer and/or committee chairman, or a participating member of a major committee
- J. Participate in the planning and completion of chapter program of activities
- K. Submission of official FFA Record Book
- L. Application mailing date specified on Kansas FFA Calendar

Agribusiness ___
Production ___

STATE FARMER EVALUATION SHEET

100 Points Allowed

	Maximum	Teacher Evaluation	District Evaluations
Part I.			
A. Scholarship - - (Grade point average based on a scale of A=4, B=3, C=2, D=1, F=0)	10	______	______

3.75 - 4.0	10
3.50 - 3.74	9
3.25 - 3.49	8
3.00 - 3.24	7
2.75 - 2.99	6
2.50 - 2.74	5
2.25 - 2.49	4
2.00 - 2.24	3
1.75 - 1.99	2
1.50 - 1.74	1
1.49 & Above	0

TOTAL SCORE ______

	Maximum	Teacher Evaluation	District Evaluations
B. Leadership - -	26		
1.) Offices and Committee responsibilities	4		
District Officer	1	______	______
Local Officer (1 pt. for each office, maximum of 2 pts.)	2	______	______
Committee Chairman	1	______	______

TOTAL SCORE ______

	Maximum	Teacher Evaluation	District Evaluations
2.) Participation in FFA activities for Recognition and Awards	10		
Public Speaking			
Local	1	______	______
District	1	______	______
Proficiency Award			
District Application	1	______	______
Leadership School			
Participation	1	______	______
District or State Judging Contests (1 point per area - Land, Crops, Meats, Entomology, Farm Management, Creed, Horticulture, Newswriting, Poultry, Livestock, Dairy, Dairy Products, Ag Mechanics)	5	______	______
Other (Chapter Awards, DeKalb Ag Award, Golden Harvest, Hoards Dairymen, etc.)	1	______	______

TOTAL SCORE ______

	Maximum	Teacher Evaluation	District Evaluation
3.) Leadership Activities Sponsored by the FFA	6		
a. Radio, TV, or other speaking on behalf of FFA	1		
b. State FFA Leadership Camp	1		
c. State FFA Convention	1		
d. National FFA Convention	1		
e. Greenhand Conference	1		
f. Other (National Leadership Conference, District Leadership Conference, WEA, etc.)	1		

TOTAL SCORE__________

	Maximum	Teacher Evaluation	District Evaluation
4.) Activities Sponsored by FFA (BOAC, Safety, Fruit Sales, etc. - 1 pt. per activity)	3		
	1		
	1		
	1		

TOTAL SCORE__________

	Maximum	Teacher Evaluation	District Evaluation
5.) Leadership in School and Community (1 pt. per activity class officers, athletics, church, 4-H, Scouts, etc.)	3		
	1		
	1		
	1		

TOTAL SCORE__________

	Maximum	Teacher Evaluation	District Evaluation
C. Agricultural Mechanics - - (Based on quantity, quality, variety, and complexity in at least 3 of the following 5 areas in order to receive maximum points: Structures & Environment; Electric Power; Power and Machinery; Soil & Water Management; and Ag Mechanic Skills. These may include projects, skills & servicing.)	8		

TOTAL SCORE__________

STATE FARMER EVALUATION SHEET

	Maximum	Teacher Evaluation	District Evaluations
Part II (Agribusiness Only)			
A. Occupational Experience Program	36		
1. Gain in Business Net Worth	(6)		
a. One point for each $500.00 gain in Business Net Worth with a maximum of 3 points.	3		
b. Add 1 point each time the beginning Business Net Worth is doubled with a maximum of 3 points.	3		
2. Scope of Candidates Supervised Occupational Experience Program (Occup. Exp. Program Summary page)	10		
3. Skills and Competencies achieved	4		
4. Five most significant mechanic skills	4		
5. Five most significant safety factors	4		
6. Position advancement or machinery, equipment, & facilities owned relating to candidates occupational experience program	3		
7. Management responsibilities	3		
8. Letter of recommendation by employer or customer	2		

TOTAL SCORE ____________

	Maximum	Teacher Evaluation	District Evaluations
B. Record Book	20		
1. Completeness	14		
a. Supervised occupational experience program			
1) Program Pictures & clippings	1		
2) Record of Occupational skills	3		
3) Memo of training plan	1		
4) Description of cooperating business	1		
b. Income	1		
c. Business Expenses (includes payroll deductions)	2		

	Maximum	Teacher Evaluation	District Evaluation	
d. Personal expenses	1			
e. Cash Flow	1			
f. Inventory	1			
g. Depreciation	1			
h. Net Worth Statement	1			
				TOTAL SCORE ______
2. Accuracy	6			
a. Cash Balance (Sheet must be enclosed with application) Within 1% of cash income -- 3 pts, 1 - 5% -- 2 pts, 5 - 10% -- 1 pt, over 10% -- 0 pt.	3			
b. Accurate throughout	3			
				TOTAL SCORE ______
Part II (Production Agriculture Only)				
A. Farming Program	30			
1. Gain in Net Worth	8			
a. One point for each $500.00 gain in net worth with a maximum of 4 points.	4			
b. Add two points each time the beginning net worth doubled with a maximum of 4 points.	4			
				TOTAL SCORE ______
2. Growth, Size, and Scope of Production Enterprises (This may include one or more)	10			
				TOTAL SCORE ______
3. Skills and competencies achieved				
a. Production Management	2			
b. Marketing and Finance Management	2			
c. Mechanic skills related to farming program	2			
d. Safety factors related to farming program	2			
				TOTAL SCORE ______

	Maximum	Teacher Evaluation	District Evaluations
4. Efficiency factors relative to farming program	2		

TOTAL SCORE ______

	Maximum	Teacher Evaluation	District Evaluations
5. Machine and/or equipment owned relating to candidates production enterprises	2		

TOTAL SCORE ______

	Maximum	Teacher Evaluation	District Evaluations
B. Record Book	26		
1. Completeness	20		
a. Supervised occupational experience program			
1) Pictures & clippings	1		
2) Plans for long time farming program	1		
3) Farming program agreement	1		
4) Record of occupational skills	1		
b. Income	1		
c. Business expenses	1		
d. Personal expenses	1		
e. Cash Flow	1		
f. Inventory	1		
g. Depreciation schedule	2		
h. Operating statement	1		
i. Livestock &/or crop enterprise records including program analysis	8		

TOTAL SCORE ______

	Maximum	Teacher Evaluation	District Evaluations
2. Accuracy	6		
a. Cash Balance (Sheet _must_ be enclosed with application) Within 1% of cash income - 3 pts., 1 - 5% -- 2 pts., 5 - 10% -- 1 pt., over 10% -- 0 pt.	3		
b. Accuracy Throughout	3		

TOTAL SCORE ______

SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAM

UNIT 1

TEST

1. Describe the four types of supervised occupational experience programs.

2. List five reasons for having a supervised occupational experience program.

3. List three sources of securing horticulture type projects.

4. Discuss the preparation necessary before securing a horticulture production project.

5. Select from a list the requirements for state farmer by placing an "X" in the blank provided.

   ______a. Active member of FFA for two years.

   ______b. Accumulated 200 hours in supervised training.

   ______c. Two years of instruction in Agriculture.

   ______d. Greenhand for two years.

   ______e. An incoming senior in school or out-of-school FFA member.

   ______f. Submit official FFA record book.

   ______g. Application mailed by February 15.

SUPERVISED OCCUPATIONAL EXPERIENCE

UNIT 2

KEEPING RECORDS FOR THE SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAM

TERMINAL OBJECTIVE

Upon completion of this unit, the student will be able to select a Horticulture enterprise(s) from the various types of horticulture enterprises available, establish goals while he/she is enrolled in Horticulture, and set means for reaching those goals. The student will be able to apply the fundamentals of beginning record keeping. This objective will be considered achieved by recording entries on each page of the record book to the satisfaction of the instructor.

SPECIFIC OBJECTIVES

After completion of this unit, the student will be able to:

1. Demonstrate ability to fill out the leadership page in the record book.
2. Demonstrate ability to keep an accurate and balanced record of receipts.
3. Demonstrate ability to keep an accurate and balanced record of personal expenses.
4. Demonstrate ability to keep an accurate and balanced record of personnel expenses.
5. Demonstrate ability to keep an accurate and balanced record of labor.
6. Demonstrate ability to make a beginning of the year inventory of receivables and payables in the record book.

SUPERVISED OCCUPATIONAL EXPERIENCE

UNIT 2

INFORMATION SHEET

I. Kansas Agribusiness Record Book

   A. Leadership page examples

      1. Offices and Committees in FFA

         a. FFA President, Uniontown Chapter, May 30 1977 - May 30 1978

         b. Cooperative Activities Chairman, Local, May 30, 1977 - May 30 1978.

         c. Fun night Chairman, Local, three weeks

      2. Participation in FFA Activities

         a. Greenhand Conference, District, attended

         b. Creed Contest, Local, 1st place

         c. Horticulture Judging, District, 3rd individual, 1st team

      3. Leadership Activities Sponsored by FFA

         a. 1978, Summer Camp, State, attended

         b. 1978, Convention, State, delegate

         c. 1978, Radio Program, Local, Panel member

      4. Activities Sponsored by the FFA

         a. Fruit sales, 10 boxes, sell and deliver

         b. BOAC Community Cleanup, 1/2 day work, worked April 14.

      5. Miscellaneous Leadership

         a. Freshman football team, season

         b. Church youth group, member for year

         c. 4-H Club Treasurer, one year

         d. Pep band, one year

   B. Information on using the Record Book

      1. Guide to record book use

         a. Make all entries with a pencil

         b. Bring the record book up to date once each week

         c. If problems arise, ask for help immediately (not after the book is graded.)

      2. Grading the record book

         a. The record book will be graded by the instructor during the school year. The three summer months will be graded the the week after school begins and comprise one record book grade for the nine weeks.

INFORMATION SHEET

3. Preparing the Record Book for use
   a. Print name, etc., on cover in ink
   b. Transfer necessary information from last record book
   c. Additional pages may be added if necessary
4. Account book hints
   a. Income and Expense pages
      1. Be sure you get all items down and have them in the correct columns.
      2. If you have an agreement to exchange products for labor, put the transaction in both expenses and receipts so they cancel out.
   b. Depreciation Schedule
      1. This determines salvage value by today's standards. Depreciable balance equals cost minus salvage value.
      2. Method of depreciation if straight line (S.L.), this means we take the same amount off each year. On machinery you are allowed to take off 20% additional the first year. Remember: 1-15 you get full credit for that month; after the 16th you credit only half the month.
   c. Receivables and Payables
      1. Line 1 - cash in pocket or home on dresser
      2. Line 2 - checking account only
      3. Line 3 & 10- savings account, bonds, C. D.'s, loans made to someone.

         This box is to be worked with only on January 1 and December 31 - no time in between these. Also, the regular year plus new accounts should equal the total of the old accounts and end the year.

C. Importance of Accurate Tax Records
   1. Records identifying receipts make it possible to substantiate the fact that some of these receipts are from a source which makes them non-taxable.
   2. If expenses are not recorded at the time they are incurred or paid, some may be overlooked or forgotten when preparing a tax return.

      (NOTE: An overlooked item of $25.00 could cost you $5.00 or more in extra tax dollars.)
   3. Upon audit of an income tax return by the Internal Revenue Service, good records are needed to verify the items reported.

INFORMATION SHEET

4. If records show the date an asset was acquired, for what it was used, and whether it was sold, traded, destroyed, or otherwise disposed of, capital gains provisions of the law or 100 per cent loss provisions can sometimes be claimed.
5. Records are valuable for efficient Horticulture management and provide a basis for analyzing a business and for obtaining credit.
6. Records should establish the amount of earning to be reported for self-employment social security tax purposes.

(NOTE: Cancelled checks and deposit slips are best verifications of transactions.)

LEADERSHIP ACTIVITIES

Offices Held and Committee Responsibilities in the FFA

School Year	Committee chairman, Office held	Unit: Local-State	Length of Service	School Year	Committee chairman, Office held	Unit: Local-State	Length of Service

Participation in FFA Activities for Awards and Recognition

List below activities such as: livestock judging, crop and soil judging, public speaking, FFA Foundation awards, FFA band, FFA chorus, individual showing of crops and livestock, recreational activities.

School Year	Activity	Level of Participation	Placing or Winnings	Responsibility

Leadership Activities Sponsored by the FFA

FFA activities that provide leadership participation such as: public speaking, radio and TV programs, conventions, FFA camp or other special leadership events.

Year	Leadership Activity	Level of Participation	Status or Rank

Activities Sponsored by the FFA

FFA activities that involve group planning, group financing and group participation such as: cooperative buying or selling, pig chains, educational tours, parent-member banquets, sponsorship of local fairs and preparing chapter exhibits for fairs and shows.

Year	Activity	Level of Participation	Scope	Responsibility

Leadership in School and Community Activities Other Than FFA

Activities not sponsored by the FFA: class officer, captain of athletic team, breed associations, showing livestock or crops, not FFA.

Year	Activity and or Organization	Level of Participation	Length of Service Responsibilities or Winnings

HORTI SC U2-8

RECORD OF OCCUPATIONAL SKILLS

List the major jobs and a description of skills performed during occupation experience on job, school labs or supervised farming programs. Those who wish to keep a daily record of jobs performed may secure additional pages from their instructor. (Student may include initial, improvement and supplemental skills.)

This page should be checked by your instructor each grading period.

Major Jobs or Skills	Date of Experience	Total Hours	Performed Satisfactorily Checked By Inst.

DESCRIPTION OF COOPERATING BUSINESS

Completing this description of the business or enterprise where you work will help orient you to your new responsibilities.

Name of business ________________________________

Major products or services ________________________________

Geographic area where customers are located ________________________________

Type of customer (wholesale-retail)—describe briefly ________________________________

Approximate number of customers served per week ________________________________

Average sale per customer (dollar value) ________________________________

Major facilities and buildings of the company and their locations (describe briefly) ________________________________

Major items of equipment which you will operate ________________________________

Number and type of employees with whom you will work ________________________________

Other information about this business ________________________________

Ag Mechanics Activities

Project ______________ where work was performed ______________________________

Percent of work completed by student __________ Material cost __________

Estimated value of project ______ Student share of material cost __________

Skills and competencies performed

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________
6. ______________________________
7. ______________________________
8. ______________________________
9. ______________________________
10. ______________________________

Safety Habits Utilized on Project

1. ______________________________
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________

Date Started ______________, 19______

Length of time to complete project __________

Utilization of project ______________________________

Year________________

HORTI SC U2-11

INCOME

Line No.	Date	Amount Received		To Whom Sold	Items Sold	No. of Units	Total Weight	Unit Price		Taxable Non-Business Income				Misc. Income	
2															
3															
4															
5															
6															
7															
9															
10															
11															
12															
13															
14															
15															
16															
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27															
28															
29															
30															
31															
32															
33															
34															
35															
36															
38															
39															
TOTALS				Transfer Totals to Next Page											
		A								1		2		3	

Column A should equal colums 1 to 12

TM 5

HORTI SC U2-11A

INCOME

Line No.	CROPS SOLD			MARKET LIVESTOCK SOLD			Dairy or Breeding Livestock and Other	NON TAXABLE INCOME	
								Loans	Other
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
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22									
23									
24									
25									
26									
27									
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29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
	4	5	6	7	8	9	10	11	12

TM 5 A

Year______________

EXPENSES

HORTI SC U2-12

Line No.	Date	Check Number	Amount Paid By Cash or Check		Paid To	Item	No. of Units	Total Weight	Price		Labor Hired		Repairs, Maintenance		Taxes Interest, Rent, etc.	
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
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39																
40	Totals				Transfer totals to next page											
			A								1		2		3	

Col. A should equal the total of columns 1 to 13

EXPENSES

Line No.	All Feed Bought	Seed & Other Crop Expenses	Trucking and Machine Hire	Veterinary and Other Livestock Expense	Business Fuel & Oil (not auto or house)	Stocker and Feeder Livestock	New Capital Investments		Paid on Notes, Money Loaned	Deductible non-business
							Dairy or Breeding Livestock	Land, Machinery, Equipment, etc.		
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	4	5	6	7	8	9	10	11	12	13

PERSONAL EXPENSES

Year______

Month	Day	Item	Auto Transportation		Recreation		Capital Purchases		Education		Contributions				Other Personal Items	
		Transfer totals	$		$		$		$		$		$		$	

PAYROLL DEDUCTIONS

Line No.	Federal Income Tax		State Income Tax		Social Security		Other			
1										
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Cut Here

4A 5A 6A 7A 8A TM 8

CASH FLOW STATEMENT

Year ____________________
PERIOD

	Transaction										
	INCOME (From Income Pages)										
1	Taxable Non-business Income (Col. 1)										
2	Other Income (Col. 2)										
3	Misc. Income (Col. 3)										
4	Crops Sold (Col. 4)										
5	Crops Sold (Col. 5)										
6	Crops Sold (Col. 6)										
7	Other Income (Col. 7)										
8	Market Livestock Sold (Col. 7)										
9	Market Livestock Sold (Col. 8)										
10											
11	Other Income (Col. 9)										
12	Dairy or Breeding Livestock & Other (Col. 10)										
13	Non Taxable Income—Loans (Col. 11)										
14	Non Taxable Income—Other (Col. 12)										
15	Total Cash Income										
	EXPENSES (from Expense Pages)										
16	Labor Hired (Col. 1)										
17	Repairs—Machinery (Col. 2)										
18	Repairs—Buildings (Col. 2)										
19	Taxes, Interest, Rent (Col. 3)										
20	Feed Bought (Col. 4)										
21	Seed and Other Crop Expense (Col. 5)										
22	Trucking and Machine Hire (Col. 6)										
23	Veterinary & Other Livestock Expense (Col. 7)										
24	Business Fuel and Oil (Col. 8)										
25	Other Expense (Col. 4B)										
26	Other Expense (Col. 5B)										
27	Other Expense (Col. 6B)										
28	Other Expense (Col. 7B)										
29	Other Expense (Col. 8B)										
30	Total Current Expense (Cols. 1 thru 8B)										
31	Livestock for Resale (Col. 9)										
32	Dairy or Breeding Livestock (Col. 10)										
33	Land, Machinery & Equipment Purchased (Col. 11)										
34	Loan Payments (Col. 12)										
35	Deductible Non-business Expenses (Col. 13)										
36	Net Cash Outflow (Total Lines 30 to 35)										
37	Total Personal Expense — Page										
38	Total Cash Outflow (Line 36 plus 37)										

CASH FLOW (continued)

1														
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DEPRECIATION SCHEDULE

Breeding livestock — remaining balance plus salvage value is transferred to inventory pages
Original cost — include the total cost of item if owned in partnership.
Value my share — original cost x % ownership

Type of Assets ______________________
(Personal, Machinery Purchased, Breeding Livestock)

									TOTAL	
1	Description								xxx	
2	Identification Number								xxx	
3	Date Acquired								xxx	
	Original Cost or Other Basis									
5	Years of Life								xxx	
6	Depreciation Method								xxx	
7	% Ownership								xxx	
8	Value My Share								xxx	xx
9	Investment Credit Claimed									
10	20% First Year Depreciation									
11	Salvage Value									
12	Annual Depreciation (if straight line)								xxx	xx
13	Depreciation Claimed in Prior Years								xxx	xx
14									xxx	xx
15									xxx	xx
16	Depreciable Balance									
17	Year ______ Depreciation Taken									
18	Depreciable Balance									
	Year ______ Depreciation Taken									
20	Depreciable Balance									
21	Year ______ Depreciation Taken									
22	Depreciable Balance									
23	Year ______ Depreciation Taken									
24	Depreciable Balance									
25	Year ______ Depreciation Taken									
26	Depreciable Balance									
	Year ______ Depreciation Taken									
28	Depreciable Balance									
29	Year ______ Depreciation Taken									
30	Depreciable Balance									

INVENTORY OF RECEIVABLES AND PAYABLES

Year ______

Receivables

Cash Receivables	Beginning of Year		End of Year	
1 Cash on Hand				
2 Checking accounts (less outstanding checks)				
3				
4				
5 Totals Cash Receivables				
	A			

Accounts Receivable			Beginning Accounts		New Accounts		Received on old Year		End of Year	
Persons Who Owe Me	Date Due	Interest Rate								
6 Savings										
7										
8										
9 People who owe me										
10 Bonds, stocks, etc.										
11										
12 Totals Accounts Receivable										
Column A plus B minus C equal D			A		B		C		D	

Payables

Accounts Payable			Beginning of Year		New Accounts		Paid on old Account		End of Year	
Persons I owe	Date Due	Interest Rate								
13 Taxes										
14 Rent										
15 Charge accounts and businesses, feed, supplies, etc.										
16										
17										
18										
19										
20										
21										
22 Total Accounts Payable										
Column A plus B minus C equal D			A		B		C		D	

TM 12

NET WORTH STATEMENT

	ASSETS	Beginning of Year Values							
		Year ____		Year ____		Year ____		Year ____	
1	Crops, Grains and Feeds (Inv. Crops, Supplies, Land & Other L. 13)								
2	Seeds (Inv. Crops, Supplies, Land & Other L. 18)								
3	Supplies (Inv. Crops, Supplies, Land & Other L. 24)								
4	Land (Inv. Crops, Supplies, Land & Other L. 28)								
5	Other (Inv. Crops, Supplies, Land & Other L. 33)								
6	Beef (Inv. Livestock L. 11)								
7	Dairy (Inv. Livestock L. 18)								
8	Swine (Inv. Livestock L. 27)								
9	Sheep (Inv. Livestock L. 39)								
10	Poultry (Inv. Livestock L. 43)								
	Other (Inv. Livestock L. 46)								
12	Other (Inv. Livestock L. 49)								
13	Machinery and Equipment (from depreciation pages) *								
14	Salvage Value on Above Items (from depreciation pages, L. 11, total col.)								
15	Buildings and Improvements (from depreciation pages) *								
16	Salvage Value on Above Items (from depreciation pages)								
17	Receivable Cash (Inv. Receivables, L. 5, col. A)								
18	Accounts (Inv. receivables, L. 12, col. A)								
19	Total Assets (Total, Lines 1 thru 18)								
	LIABILITIES								
20	Payables (Inv. Payables, L. 22, col. A)								
21	Business Net worth (L. 19 minus L. 20)								
22	Personal Net Worth (from depreciation pages)								
23	Total Net Worth (L. 21 + 22)								
24	Change in Business Net Worth **								
25	Net Income from sources other than your own business ***								
26	Gain in business net worth minus income from other sources								
27	Net Cash Business Income (from oper. stmt. method pg____col____)(L. 26, col. B)								
28	Profit or Loss from Operation (from operating statement) (L. 41, col. B)								

*From depreciation pages for this type asset, total column, depreciable balance of previous year.

**Present year beginning net worth minus immediate past year's beginning inventory

***Income page column 1 minus Expense page column 13

Service Record

Machine Serviced ____________________

Item Serviced	Date Miles or Hours	Date Miles or Hours	Date Miles or Hours	Date Miles or Hours
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Service Record

Machine Serviced ____________________

Item Serviced	Date Miles or Hours	Date Miles or Hours	Date Miles or Hours	Date Miles or Hours
1				
2				
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8				
9				
10				

Service Record

Machine Serviced ____________________

Item Serviced	Date Miles or Hours	Date Miles or Hours	Date Miles or Hours	Date Miles or Hours
1				
2				
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4				
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7				
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9				
10				

Service Record

Machine Serviced ____________________

Item Serviced	Date Miles or Hours	Date Miles or Hours	Date Miles or Hours	Date Miles or Hours
1				
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PLANT CLASSIFICATION

UNIT 1

PLANT CLASSIFICATION

TERMINAL OBJECTIVE

Upon completion of this unit, students will be able to correctly use given words that pertain to the categories of plant classification; and to demonstrate familiarity with the principles of plant classification. This objective will be considered achieved upon attainment of a score of eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, students will be able to:

1. Match terms pertaining to plant identification characteristics.

2. List four systems of plant classification.

3. Classify plants by the binomial system. (Assignment Sheet #1)

4. Match some common horticulture plants with their center of origin and know terms used to classify plants by center or origin.

5. Classify plants based on utilization.

6. Describe the four plant life cycles.

7. Describe plant leaves using correct descriptive terms. (Assignment Sheet #2)

8. Use a plant key to classify and identify plant materials. (Assignment Sheet #3)

PLANT CLASSIFICATION

UNIT 1

INFORMATION SHEET

I. Terms and Definitions:

A. Aggregate - A cluster of small fruits developing from one flower, such as a blackberry.

B. Alternate - Leaves arranged at different levels along a stem, only one leaf at a place.

C. Angular - Coming to a point, such as the space between lobes of some leaves.

D. Anther - The pollen-bearing part of a stamen, usually at the end.

E. Awl-shaped - Tapering to a long, sharp point.

F. Blade - The flat part of a leaf.

G. Bract - A small leaf-like structure below some flowers.

H. Bud - The enlarged organ on the side or the end of a stem enclosing the undeveloped stem, leaf, or flower.

I. Calyx - The outer portion of a flower, usually green.

J. Capsule - A dry fruit usually containing more than one seed and opening at maturity.

K. Catkin - A long cluster of many small flowers.

L. Compound - Composed of several parts. A compound leaf has the blade divided into several smaller parts. A twice-compound leaf has branches from the main central stalk and the leaflets on these branches.

M. Corolla - The part of the flower next to the calyx, either white or colorful. The individual parts are petals.

N. Crown - The part of a tree above the trunk.

O. Deciduous - Losing the leaves in the autumn.

P. Downy - Covered with short, soft hairs.

Q. Elliptic - Rounded sides and pointed ends, similar to a football.

R. Entire - Without teeth on the edge of a leaf.

S. Evergreen- The leaves remain on the tree during winter, keeping their green color.

T. Filament - The part of a stamen supporting the anther, usually thread-like.

U. Flesh - The bulky part of a fruit, often juicy.

V. Fruit - The ripened ovary containing the seeds.

W. Husk - The outer, dry portion of some nuts.

X. Incurved - The top curved in toward the body. The teeth curved toward the leaf.

INFORMATION SHEET

Y. Kernel - The edible part of a nut.

Z. Lance-shaped - Widest below the middle and tapering to a point.

A1. Leaflet - One segment of a compound leaf. A section of the blade.

B1. Leaf scar - The scar remaining when a leaf breaks off, usually below a bud.

C1. Linear - Long and narrow with nearly parallel margins.

D1. Lobe - An extended portion of a leaf. A knob-like structure on a leaf.

E1. Margin - The edge of a leaf or other flat structure.

F1. Multiple fruit - A cluster of small fruits developing from several flowers on a common axis.

G1. Node - The place on a stem where the leaves are attached.

H1. Nut - A one-seeded, hard, dry fruit which does not break open.

I1. Oblong - Parallel sides, usually with rounded ends.

J1. Opposite - Arranged on two sides of a stem at the same level.

K1. Ovary - The enlarged base of a pistil, containing the undeveloped seeds.

L1. Palmate - Arranged around a center.

M1. Petal - The colorful part of a flower. A part of a corolla.

N1. Petiole - Stalk of a leaf.

O1. Pinna - A division of a compound leaf

P1. Pinnate - Having the leaflets arranged on two sides of a central stalk. In a twice-compound leaf, the leaflets are arranged on the sides of a branch stalk.

Q1. Pistil - The innermost part of a flower, composed of stigma, style and ovary.

R1. Pith - The soft portion in the center of a stem.

S1. Pod - Usually a long structure enclosing the seeds, such as a bean pod.

T1. Porous - Full of small holes.

U1. Ridged - Having raised lines on the surface.

V1. Scales - Small, flat structures on a surface. The outer covering of a bud.

W1. Weed - The ripened ovule. The structure for producing a new plant.

X1. Sepal - A portion of a calyx. The outer, usually green, part of a flower.

Y1. Simple - Composed of only one part, such as an undivided leaf.

Z1. Spike - A long cluster of flowers, each flower without a stalk.

A2. Stamen - The male part of a flower, composed of filament and anther.

INFORMATION SHEET

B2. Stigma - The end portion of a pistil adapted to receive the pollen.

C2. Stipule - A small leaf-like, or spine-like, structure at the base of some leaves.

D2. Stone - The hard, central portion of some fruits, such as in the cherry.

E2. Style - The part of a pistil between the ovary and stigma, often elongated.

F2. Tapered - Gradually narrowing to a point.

G2. Teeth - The small projections on a leaf margin.

H2. Tendril - A curled portion of a stem or leaf designed to wrap around another object.

I2. Toothed - Having teeth. Teeth with small teeth on them are double-toothed.

J2. Vein - The raised lines on the underside of a leaf designed for carrying food and water.

K2. Whorled -Three or more parts arranged around a stem at the same level.

L2. Wing - A flat portion extended from the margin of a seed or fruit.

II. Systems of Plant Classification

A. Binomial

B. Center of Origin

C. Utilization

D. Life Cycle

III. Binomial System of Plant Classification

A. Developed by Carl Linneaus

B. Utilizes genus and species names (scientific name)

INFORMATION SHEET

C. Classification groupings

Kingdom	1. Animal 2. Plant
Sub Kingdom	1. Thallophyta (Algea & Fungi) 2. Embryophyta
Division	1. Bryophyta (Mosses) 2. Tracheophyta (Vascular Plants)
Sub Division	1. Psilopsidia (Extinct) 2. Lycopsida (Club Mosses) 3. Sphenopsida (Horsetails) 4. Pteropsida (Ferns & Seed-bearing plants)
Classes	1. Filicinae (Ferns) 2. Gymnospermae (Conifers) 3. Angiospermae (Seed Plants)
Sub Classes	1. Monocotyledoneae (Grasses) 2. Dicotyledoneae (Broadleaf Plants)
Order	
Family	
Genus	
Species	
Varieties	

D. Scientific Names of Some Common Horticultural Plants

1. Grass Family (Subclass - Monocotyledoneae; Order - Graminales; Family - Gamineae),

a. Corn	Zea mays L.
b. Kentucky Bluegrass	Poa pratensis L.
c. Bermudagrass	Cynodon dactylon L.

2. Lily Family (Subclass - monocotyledoeae; Order - Liliales; Family - Liliacreae).

a. Onion	Allium cepa
b. Easter Lily	Lillium longifolium

3. Legume Family (Subclass - Dicotyledoneae; Order - Rosales: Family - Leguninoseae

a. Peanut	Arachis hypogea L.
b. Garden Pea	Pisum sativa L.

INFORMATION SHEET

4. Rose Family (Subclass - Dicotyledoneae; Order- Rosales; Family - Rosceae).

a.	Apple	Malus pumila
b.	Peach	Prumus perica
c.	Strawberry	Fragaria vesca

5. Nightshade Family (Subclass - Dicotyledoneae; Order - Polemoniales; Family - Solanaceae).

A.	Potato	Solanum tuberosum L.
B.	Tomato	Lycopersicon esculentum

*See Reference Sheet: Tree and Shrub Families

IV. Plant Classification by Center of Origin

A. Indigenous - plants that are native to an area

B. Exotic - plants that have been introduced to an area

C. Center of Origin of Some Common Horticultural Plants

VEGETABLES

1.	Potato	South America
2.	Spinach	Iran
3.	Corn	Peru
4.	Lima Bean	Guatemala
5.	Tomato	Peru
6.	Winter Squash	South and Central America
7.	Summer Squash	Central America
8.	Peppers	Peru
9.	Sweet Potato	West Indies
10.	Kohlrabi	Germany
11.	Brussel Sprouts	Northern Europe
12.	Kale	Eastern Mediterranean
13.	Collards	Western Asia
14.	Head Cabbage	Northern Italy and Southwestern France
15.	Broccoli	Mediterranean
16.	Cauliflower	Mediterranean
17.	Asparagus	Eastern Mediterranean
18.	Endive	Eastern Mediterranean
19.	Celery	Mediterranean
20	Parsley	Mediterranean
21.	Beet	Mediterranean
22.	Swiss Chard	Mediterranean

INFORMATION SHEET

23.	Turnip	Eastern Mediterranean
24.	Rhubarb	Asia Minor
25.	Watermelon	African Interior
26.	Okra	Africa
27.	Lettuce	Asia Minor
28.	Muskmelon	Persia
29.	Carrot	Near East
30.	Onion	Middle Asia
31.	Peas	Near East
32.	Cucumbers	India
33.	Eggplant	India
34.	Cowpeas	India
35.	Radishes	China

NARROW LEAF EVERGREENS

1.	Pfitzer Juniper	China
2.	Red Cedar	China
3.	Norway Spruce	Northern Europe
4.	Colorado Spruce	Rocky Mountains
5.	Mugo Pine	Southern Europe
6.	Redwood	California and Oregon
7.	Japanese Yew	Japan and Korea
8.	Arborvitae	China and Korea

BROAD LEAF EVERGREENS

1.	Southern Magnolia	Southeast United States
2.	Firethorn	Italy and West Asia
3.	Rhododendron	Virginia and Georgia
4.	Azalea	Japan
5.	Yucca	Southwest United States and Mexico

GROUND COVERS AND VINES

1.	Bittersweet	East United States
2.	Celmatis	Europe
3.	Winter Creeper	China
4.	English Ivy	Europe
5.	Vinca Minor	Europe
6.	Wisteria	China

INFORMATION SHEET

ORNAMENTAL DECIDUOUS SHRUBS

1.	Common Lilac	Europe
2.	Bridalwreath Spirea	Japan and China
3.	Japanese Barberry	Japan
4.	Flowering Quince	China
5.	Creeping Cotoneaster	China
6.	Weeping Forsythis	Japan
7.	Rose of Sharon	China and India
8.	Lodonse Privet	Europe
9.	Winter Honeysuckle	China
10.	Crape myrtle	China

ORNAMENTAL DECIDUOUS TREES

1.	Russian Olive	Europe
2.	Sugar Maple	Eastern United States
3.	Saucer Magnolia	China
4.	Horse Chestnut	Europe
5.	Pecan	Eastern United States
6.	Paul's Scarlet Hawthorn	Europe
7.	Ginko	China
8.	Golden Rain Tree	China and Japan
9.	Sweetgum	Eastern United States
10.	Redbud	Central and Eastern United States

HOUSE PLANTS AND CUT FLOWERS

1.	Rex Begonia	Assam
2.	Heartleaf Philodendron	Central America
3.	Rubber Plant	India
4.	Sansevieria	South Africa
5.	African Violet	East Africa
6.	Pot Mum	Japan
7.	Airplant Plant	South Africa
8.	Bird of Paradise	South Africa
9.	Daffodil	Mediterranean
10.	Poinsettia	Mexico

INFORMATION SHEET

11.	Devil's Ivy	South Pacific
12.	Snapdragon	Southern Europe
13.	Gloxinia	South Africa
14.	Hydrangea	Japan
15.	Azalea	Japan
16.	Easter Lily	Japan
17.	Kalanchoe	Madagascar
18.	Christmas Cactus	South Africa
19.	Peperomia	South Africa
20.	Dracaena	Madagascar
21.	Dieffenbachia	Central and South America
22.	Schefflera	New Zealand
23.	Jade Plant	South Africa
24.	Aster	China
25.	Gladiolus	Tropical Africa
26.	Baby's Breath	Europe
27.	Strawflower	Australia

INFORMATION SHEET

V. Plant Classification Based on Utilization

A. Cereal grains - Barley oats, rice, corn, millet, rye, sorghum, wheat. Plants grown for their edible seeds.

B. Small grains - Barley oats, rice, rye, and wheat. Excluding the large grained cereals.

C. Forages - Most grasses and herbaceous legume crops in which the stems and leaves rather than the grain are consumed by livestock. Pasture, hay, corn, silage, and green feeding.

D. Fiber - Cotton, flax, hemp, jute, and sisal (agave). Sources for natural fibers for textile, rope, and twine.

E. Oil - Caster bean, coconut, cotton, flax, peanut, safflower, sunflower, corn, soybean, and olive. Produced for edible or industrial oils and fats.

F. Root - Potato, sweet potato, beets, carrots, radish, turnip , yam, onion, and garlic. Grown as vegetable foods.

G. Sugar - Sugarcane, sugarbeet, sweet sorghum, sugar maple, and corn.

H. Fruit - Apple, banana, blueberry, cranberry, peach, pear, plum, orange, strawberry, grape, mango, and pineapple. Usually used as dessert and snack foods.

I. Vegetables - Lettuce, celery, cabbage, parsley, endive, spinach, chard, corn, mustard, kale, melons, cucumbers, squash, tomato, eggplant, pepper, garden peas, beans, mung beans, and chick peas. See also root crops.

J. Ornamentals - Shade trees, flowering trees, evergreen trees, evergreen shrubs, vines, ground covers, annual and perennial garden flowers, cut flowers, and potted plants.

K. Cover crops - Small grains, vetch, and other legumes. (Used for prevention of soil erosion during idle season.)

L. Green manure - Any crop grown to be incorporated into the soil for purposes of soil improvement.

M. Nut crops - Walnuts, pecans, cashew, filbert, Brazil nut, and peanut.

N. Drug, spices, and herbs - tobacco, mint hops, clove, nutmeg, mustard, hemp, sage, and dill.

O. Beverages - Coffee, cocoa, tea, mate, and cola.

VI. Plant Classification by Life Cycle

A. Summer Annuals - Complete their entire life cycle (from seed to seed) in a single growing season, and then die.

B. Winter Annuals - Utilize parts of two growing seasons in completing their life cycle. They are planted in the fall, are dormant during the winter, after which they produce seed and die the following summer.

C. Biennials - Requires two growing seasons to complete their life cycle. Vegetative growth occurs during the first season, and after over wintering the flower and fruit are set during the second season.

D. Perennials - Have an indefinite life period. Potentially the plants have the ability to live for ever, and differ from the other life patterns in that they do not die after reproduction.

PLANT CLASSIFICATION

UNIT 1

ASSIGNMENT SHEET #1: Binomial Plant Classification

Instructions: Classify by the binomial system the following plants:

	Apple	Peanut	Onion	Corn
KINGDOM				
SUB KINGDOM				
DIVISION				
SUB DIVISION				
CLASS				
SUB CLASS				
ORDER				
FAMILY				
GENUS				
SPECIES				

REFERENCE SHEET: Tree and Shrub Families

Aceraceae	Maple Family
Acer	Maple
Anacardiaceae	Cashew Family
Cotinus	Smoke Tree
Rhus	Sumac
Pistacia	Pistachio
Annonaceae	Annona Family
Asimina	Papaw
Apocynaae	Dogbane Family
Vinca	Periwinkle
Aquifoliaceae	Holly Family
Ilex	Holly
Arliaceae	Gensing Family
Acanthopanax	Acanthopanax
Aralia	Aralia
Hedera	Ivy
Aristolochiaceae	Birthwort Family
Aristolochia	Birthwort
Asteraceae (Compositae)	Aster Family
Baccharis	Baccharis
Berberdaceae	Barberry Family
Berberis	Barbery
Mahoberberis	Mahoberberis
Mahonia	Mahonia
Nandina	Nandina
Betulaceae	Birch Family
Alnus	Alder
Betula	Birch
Carpinua	Hornbeam
Corylus	Hazelnut
Ostrya	Hop-Hornbeam
Bignoniaceae	Bignonia Family
Campsis	Trumpet Creeper
Catalpa	Catalpa
Buxaceae	Box Family
Buxux	Box
Pachysandra	Pachysandra
Calycanthaceae	Calycanthus Family
Calycanthus	Sweetshrub
Caprifoliaceae	Honeysuckle Family
Abelia	Abelia
Dierville	Dierville
Kolkwitzia	Beautybush
Lonicera	Honeysuckle
Sambucus	Elder
Symphoricarpos	Snowberry-Wolfberry
Viburnum	Viburnum
Weigela	Weigela
Celastraceae	Staff Tree Family
Celastrus	Bittersweet
Euonymus	Spindle-Tree
Pachistime	Pachistima
Cercidiphyllaceae	Katsura Tree Family
Cercidiphyllum	Katsura Tree
Clethraceae	White alder Family
Clethra	White alder
Cornaceae	Dogwood Family
Cornus	Dogwood
Ebenaceae	Ebony Family
Diospyros	Persimmon
Elaeagnaceae	Oleaster Family
Elaeagnus angustifolia	Russian Olive
Sheperida	Shepherida
Ericaceae	Heath Family
Erica	Heath
Kalmia	Kalmia
Leucothoe	Leucothoe
Rhododentron	Rhododendron
Fagaceae (Legume)	Beech Family
Castanea	Chestnut
Fagus	Beech
Quercus	Oak
Ginkgoaceae	Ginkgo Family
Ginkgo	Ginkgo
Guttifereae	Garcinia Family
Hypericum	St. John's Wort
Hamamelidaceae	Witch-Hazel Family
Hamamelis	Witchhazel
Liquidamber	Sweetgum

Reference Sheet

Hippocastanaceae	Horse-chestnur
Aesuius	Buckeye
Juglandaceae	Walnut Family
Carya	Hickory (pecan)
Juglans	Walnut
Fabaceae(Leguminosae)	Legume Family
Albizzia	Albizzia
Amorpha	Lead Plant
Caragana	Peashrub
Cercis	Redbud
Cladrastis	Yellowwood
Colutea	Bladder Senna
Gledistia	Honey Locust
Gymnocladus	Coffeetree
Laburnum	Golden Rain Tree
Lespedeza	Bush Clover
Robinia	Black Locust
Sophora	Pagodatree
Wisteria	Wisteria
Lauraceae	Laurel Family
Sindera	Spice Bush
Sassafras	Sassafras
Lythraceae	Loosestrife Family
Lagerstroemia	Crape Myrtle
Magnoliaceae	Magnolia Family
Liriodendtron	Tulip Tree
Magnolia	Magnolia
Halvaceae	Mallow Family
Hibicus	Hibicus
Horaceae	Mulberry Family
Ficus	Fig
Maclura	Osage Orange
Morus	Mulberry
Myricaceae	Sweet Gale Family
Myrica	Bayberry
Myrtaceae	Myrtle Family
Eucalyptus	Gum Tree
Hyssaceae	Hyssa Family
Hyssa	Tupelo

Oleaceae	Olive Family
Abeliophyllum	Abellophyllum
Buddeleia	Butterfly Bush
Chionanthus	Fringe Tree
Forsythia	Forsythia
Fraxinus	Ash
Ligustrum	Privet
Syringa	Syringa
Pinaceae	Pine Family
Abies	Fir
Cedrus	Cedar
Juniperus	Juniper
Larix	Larch
Picea	Spruce
Pinus	Pine
Pseudotsuga	Douglas Fir
Taxodium	Bald Cypress
Thuja	Arborvitae
Ysuge	Hemlock
Platanaceae	Plane Tree Family
Platanus	Plane Tree
Polygonaceae	Knotweed Family
Polygonum	Knotweed, Fleeceflower
Ranunculaceae	Buttercup Family
Clematis	Clematis
Rhamnaceae	Buckthorn Family
Ceanothus	New Jersey Tea
Rhemnus	Buckthorn
Zizyphus	Jujube
Rosaceae	Rose Family
Amelanchier	Shadbush
Aronia	Chokeberry
Chaenomeles	Flowering Quince
Cononeaster	Cotoneaster
Crataegus	Hawthorn
Cydonia	Quince
Exchorda	Pearl Bush
Melus	Apple
Physocarpus	Ninebrak
Potentilla	Clinquefoil
Prunus	Plum
Pyracantha	Pyracantha
Pyrus	Pear
Percia	Peach

Reference Sheet

Roseceae (continued)	Rose Family (continued
Rhodotypos	Jetbead
Rosa	Rose
Rubus	Blackberry
Sorbaria	False Spiraea
Sorbus	Mountain Ash
Spiraea	Spiraea
Kerria	Kerria
Rubiaceae	Madder Family
Cephalanthus	Buttonbush
Rutaceae	Rue Family
Phellodendron	Cork Tree
Pteles	Wafer Ash
Zanthoxylum	Prickly Ash
Salicaceae	Willow Family
Populus	Poplar
Salix	Willow
Sapindaceae	Soapberry Family
Koeireuteria	Golden Rain Tree
Sapindus	Soapberry
Sapotaceae	Sapodilla Family
Bumelia	Bumelia
Saxifragaceae	Saxifrange Family
Deutzia	Deutzia
Hydrangea	Hydrangea
Philadelphus	Mock Orange
Ribes	Currant
Scrophulariaceae	Figwort Family
Paulownia	Paulownia
Simaroubaceae	Quessia Family
Ailanthus	Ailanthus
Solanaceae	Nightshade Family
Lycium	Matrimony Vine
Staphyleaceae	Bladder Nut Family
Staphylea	Bladder Nut
Styracaceae	Storax Family
Helesia	Silverbell Tree
Styrex	Snowbell
Tamaricaceae	Tamarisk Family
Tamarix	Tamarisk
Texaceae	Yew Family
Taxus	Yew
Thymelaeaceae	Mezereum Family
Daphne	Daphne
Tillaceae	Linden Family
Tilia	Linden
Ulmaceae	Elm Family
Celtis	Hackberry
Ulmus	Elm
Zelkova	Zelkove
Verbenaceae	Vervain Family
Callicarpa	Beautybush
Caryopteris	Bluebeard
Vitex	Chaste Tree
Vitaceae	Grape Family
Ampelopsis	Ampelopsis
Parthenocissus	Creeper
Vitis	Grape

ASSIGNMENT SHEET #2

Needed Materials: Leaves from three different plants and reference pages HORTI SD U1-20 to HORTI SD U1-22.

Instructions: Describe the provided leaves using the terms below.

1. Leaf I. D. Number __________.

2. Leaf Type (circle one).

   SIMPLE, PINNATELY COMPOUND, ONCE PINNATE,

   PINNATELY COMPOUND, TWICE PINNATE,

   PALMATELY COMPOUND, TRIFOLIOLATE.

3. Venation (circle one).

   PARALLEL, PINNATE, PALMATE.

4. Leaf Margin (circle one).

   ENTIRE, UNDULATE, SERRATE, DOUBLY SERRATE,

   DENTATE, CRENATE, PINNATELY LOBED,

   PINNATELY PARTED, PALMATELY LOBED.

5. Leaf Shape (circle one).

   NEEDLE, AWL, LINEAR, LANCEOLATE, OVATE,

   OBLANCEOLATE, OBOVATE, OVAL, PELTATE,

   CORDATE, DELTOID, RENIFORM, SAGITTATE,

   OBLIQUE, HASTATE.

6. Leaf Apices (circle one).

   ACUTE, ACUMINATE, OBTUSE, TRUNCATE,

   EMARGINATE, CAUDATE, ARISTATE, CUSPIDATE,

   MUCRONATE, RETUSE.

7. Leaf Bases (circle one).

   ACUTE, CUNEATE, ROUNDED, CORDATE,

   SAGITTATE, HASTATE, TRUNCATE, OBLIQUE.

ASSIGNMENT SHEET #2

Needed Materials: Leaves from three different plants and reference pages HORTI SD U1-20 to HORTI SD U1-22.

Instructions: Describe the provided leaves using the terms below.

1. Leaf I. D. Number __________.

2. Leaf Type (circle one).

   SIMPLE, PINNATELY COMPOUND, ONCE PINNATE,

   PINNATELY COMPOUND, TWICE PINNATE,

   PALMATELY COMPOUND, TRIFOLIOLATE.

3. Venation (circle one).

   PARALLEL, PINNATE, PALMATE.

4. Leaf Margin (circle one).

   ENTIRE, UNDULATE, SERRATE, DOUBLY SERRATE,

   DENTATE, CRENATE, PINNATELY LOBED,

   PINNATELY PARTED, PALMATELY LOBED.

5. Leaf Shape (circle one).

   NEEDLE, AWL, LINEAR, LANCEOLATE, OVATE,

   OBLANCEOLATE, OBOVATE, OVAL, PELTATE,

   CORDATE, DELTOID, RENIFORM, SAGITTATE,

   OBLIQUE, HASTATE.

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   PINNATELY COMPOUND, TWICE PINNATE,

   PALMATELY COMPOUND, TRIFOLIOLATE.

3. Venation (circle one).

   PARALLEL, PINNATE, PALMATE.

4. Leaf Margin (circle one).

   ENTIRE, UNDULATE, SERRATE, DOUBLY SERRATE,

   DENTATE, CRENATE, PINNATELY LOBED,

   PINNATELY PARTED, PALMATELY LOBED.

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   NEEDLE, AWL, LINEAR, LANCEOLATE, OVATE,

   OBLANCEOLATE, OBOVATE, OVAL, PELTATE,

   CORDATE, DELTOID, RENIFORM, SAGITTATE,

   OBLIQUE, HASTATE.

6. Leaf Apices (circle one).

   ACUTE, ACUMINATE, OBTUSE, TRUNCATE,

   EMARGINATE, CAUDATE, ARISTATE, CUSPIDATE,

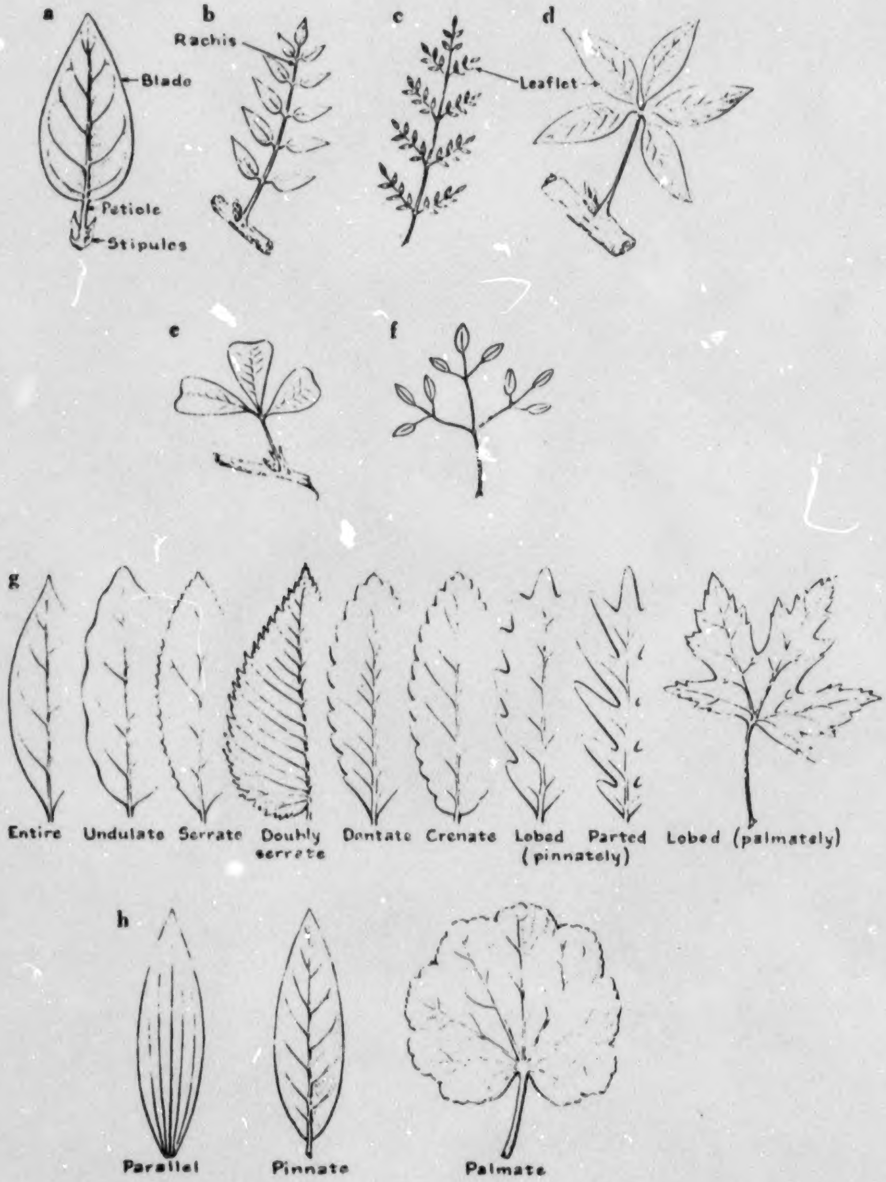
   MUCRONATE, RETUSE.

7. Leaf Bases (circle one).

   ACUTE, CUNEATE, ROUNDED, CORDATE,

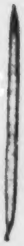
   SAGITTATE, HASTATE, TRUNCATE, OBLIQUE.

Reference Sheet: Terms Used in the Description of Leaves

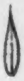

a
b
Rachis
c
d
Blade
Leaflet
Petiole
Stipules
e
f
g
Entire
Undulate
Serrate
Doubly serrate
Dentate
Crenate
Lobed (pinnately)
Parted
Lobed (palmately)
h
Parallel
Pinnate
Palmate

(a) Simple leaf and its parts. **(b, c)** Pinnately compound leaves, once pinnate **(b)** and twice pinnate **(c)**. **(d)** Palmately or digitately compound leaf. **(e)** Trifoliolate leaf. **(f)** Ternate leaf. **(g)** Leaf margins. **(h)** Leaf venation.

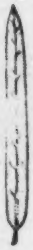
Reference Sheet: Leaf Shapes



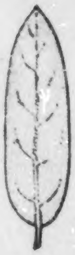
Acicular or needle-shaped



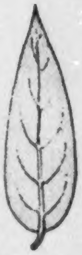
Subulate or awl-shaped



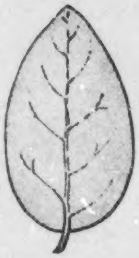
Linear



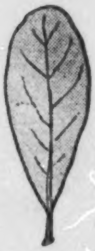
Oblong



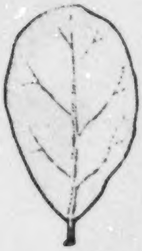
Lanceolate



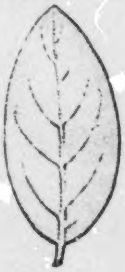
Ovate



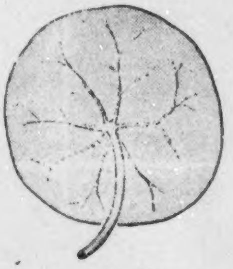
Oblanceolate



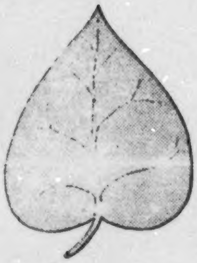
Obovate



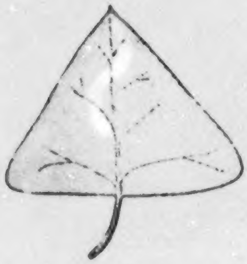
Oval



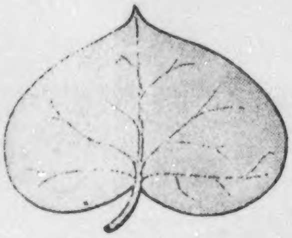
Orbicular and peltate (Petiole attached near the middle)



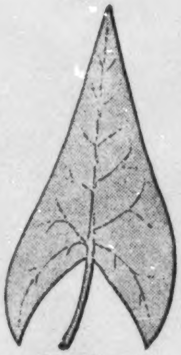
Cordate



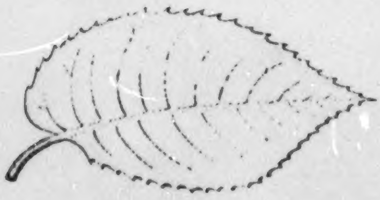
Deltoid



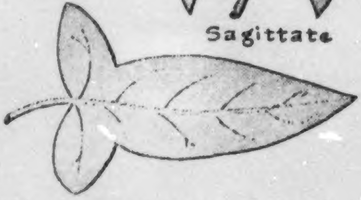
Reniform



Sagittate

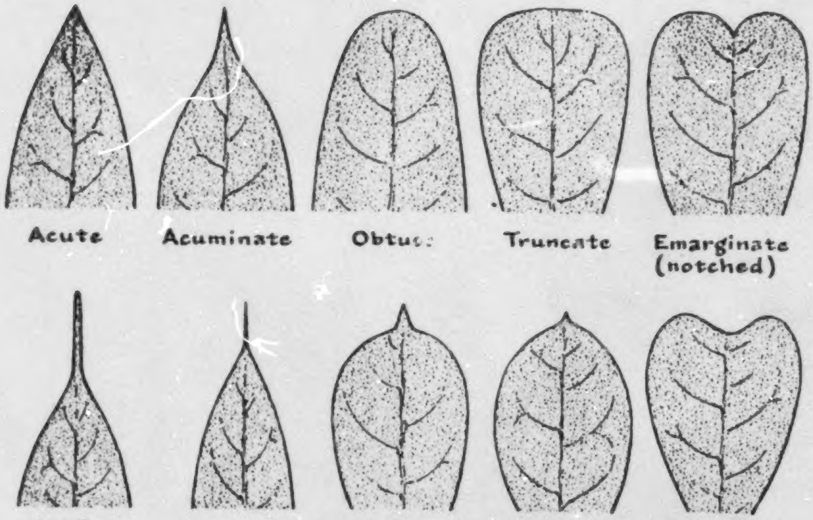


Oblique or inequilateral



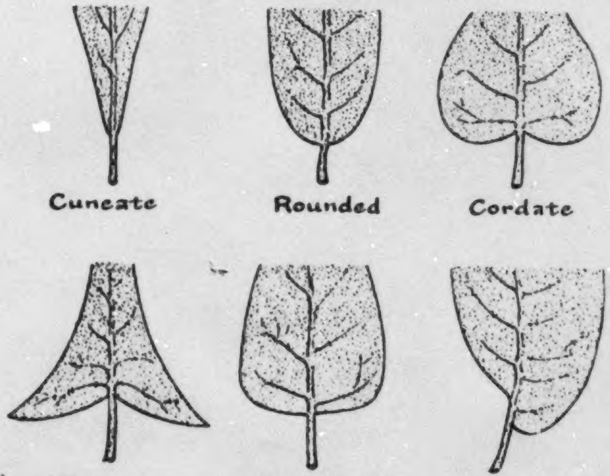
Hastate or halberd-shaped

Reference sheet; Leaf Apices and Bases



Acute
Acuminate
Obtuse
Truncate
Emarginate (notched)
Caudate
Aristate
Cuspidate
Mucronate
Retuse (with a rounded sinus at the apex)

Leaf Apices



Acute
Cuneate
Rounded
Cordate
Sagittate
Hastate
Truncate
Oblique or inequilateral

Leaf Bases

PLANT CLASSIFICATION

UNIT 1

ASSIGNMENT SHEET #3: Twig Identification

A. Needed Materials:

1. Manual

   Gates, Frank C., Winter Twigs, The Identification of Kansas Woods Plants by their Twigs., Kansas State University. Reproduced by Kansas Arborist's Association. *

   *Order from: Dr. Ray Keen or Dr. S. M. Still
   Waters Hall
   Kansas State University
   Manhattan, Kansas 66506

2. Five different native winter tree twigs for each student.

B. Each student will identify the five given twigs by using the manual on Winter Twigs.

II. Plant Description and Classification

A. Needed Materials:

1. Stephens, H. A., Trees, Shrubs, and Woody Vines in Kansas, The University Press of Kansas, Lawrence, Kansas.
2. Twigs used in above activity.
3. Handout on plant classification (HORTI SD U1-24

B. The students will complete a plant characteristics sheet on each of the trees identified.

HORTI SD U1-24

PLANT DESCRIPTION AND CLASSIFICATION

COLLECTION DATA:

Common Name ____________________

Scientific Name (Genus)______________ (Species)____________________

Family Name ____________________

Where Collected ____________________

Collected by____________________

Identified by____________________

Date Collected ____________________

Mature size of tree __________
Tree form (shape) __________
Degree of hardiness __________

Growth: Fast____Moderate____Slow____

Native____ Introduced____ to Kansas

Habitat: Meadow____ Prairie____
Forest____ Aquatic____
Marsh_____ Waste____
Other______

PLANT CHARACTERISTICS:

TWIG: color____________________
texture____________________
pith____________________
misc.____________________

BUDS: color____________________
texture____________________
scales____________________
misc.____________________

BARK: appearance (color)______________
texture____________________
misc.____________________

LEAF: fall color____________________
arrangement____________________
type____________________
shape ____________________
persistence____________________
size ____________________
margin ____________________
misc.____________________

FLOWER: color____________________
when does it flower______________
misc.(flow

SKETCH OF TWIG AND BUDS

PLANT CLASSIFICATION

UNIT 1

REFERENCE SHEET: Identification of Woody Plants by their Twigs

With a little practice, woody plants are as easily identified by their twigs as any other way. The size, shape, color, and appendages give us a start; then the buds--their position (terminal and lateral), arrangement (alternate, opposite, or whorled), size, shape, color, surface, and contents; the pith, (size, shape in cross section, color, and continuousness); and less frequently additional characteristics as odor or brittleness complete the identification

WOODY TWIG IDENTIFICATION KEY

Example:

Briefly a key is a way of identification by means of contrasting characters. In following through a key, one starts with the number 1's, reading both, and finding which applies to the plant in question. This being the second number 1. Refer to the key and see that the second number 1 reads--Foliage leaves deciduous (if occasionally persistent as in oaks, then brown not evergreen).

The user then takes up the 2's under the number 1 selected, reads both and selects the 2 that fits, this being the second number 2. Refer to your key and find that it reads--Leafscars alternate (that is, with but one leafscar at a node).

The user then takes up the 3's under the number 2 selected, reads them and selects the 3 that fits, this being the second number 3. Refer to your key and find that it reads--Twigs without complete stipular rings.

The user than takes up the 4's under the number 3 selected, reads them and selects the 4 that fits, this being the second number 4. Refer to your key and find that it reads--Without thorns, prickles, or spines, but some may have thornlike stunted branches.

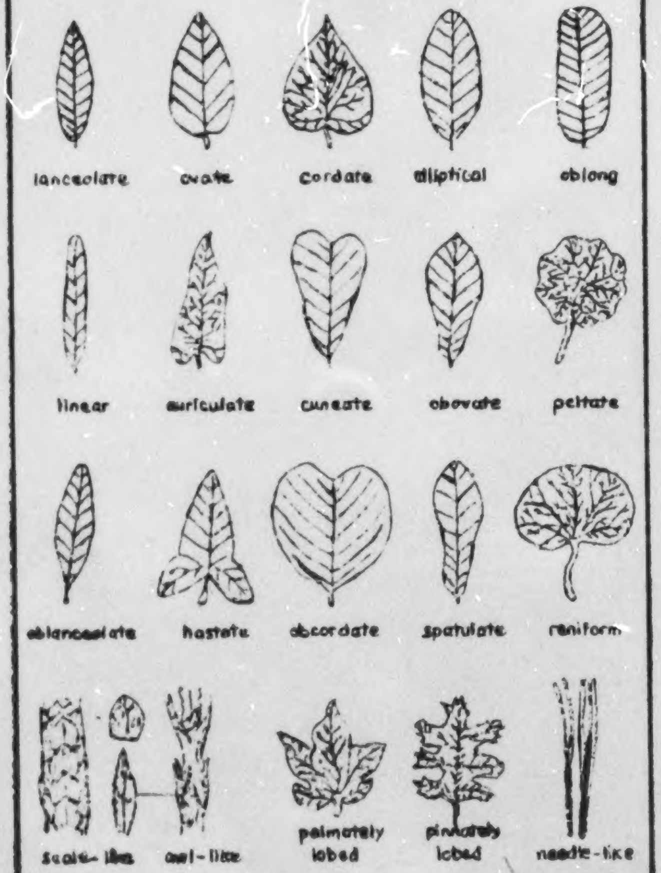
The user then takes up the 5's under the number 4 selected, reads them and selects the 5 that fits, this being the first number 5. Refer to your key and find that it reads--Climbing and scrambling.

The user then takes up the 6's under the number 5 selected, reads them and selects the 6 that fits, this being the first number 6. Refer to your key and find that it reads--With tendrils or aerial roots.

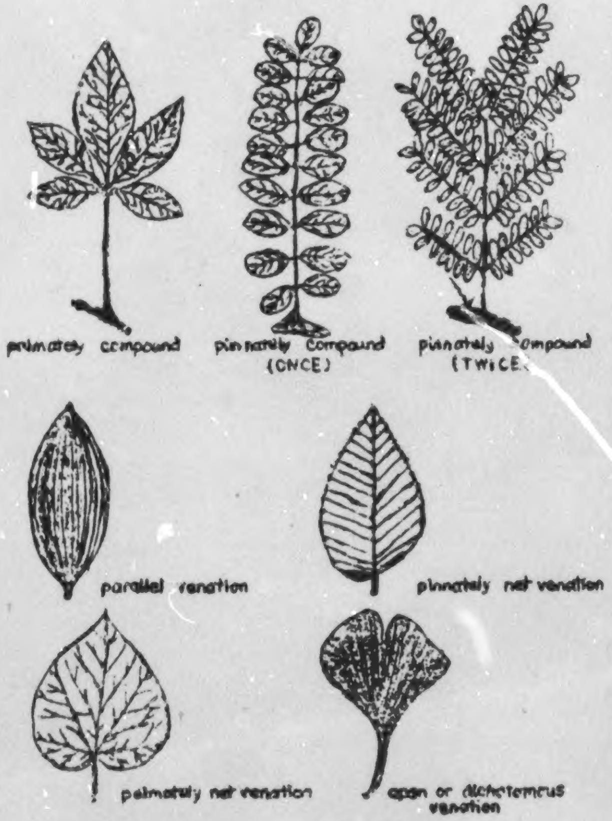
The user then takes up the 7's under the number 6 selected, reads them and selects the 7 that fits, this being the second number 7. Refer to your key and find that it reads--With aerial roots but without tendrils; poisonous.

Poison Ivy (Rhus toxicondendron)

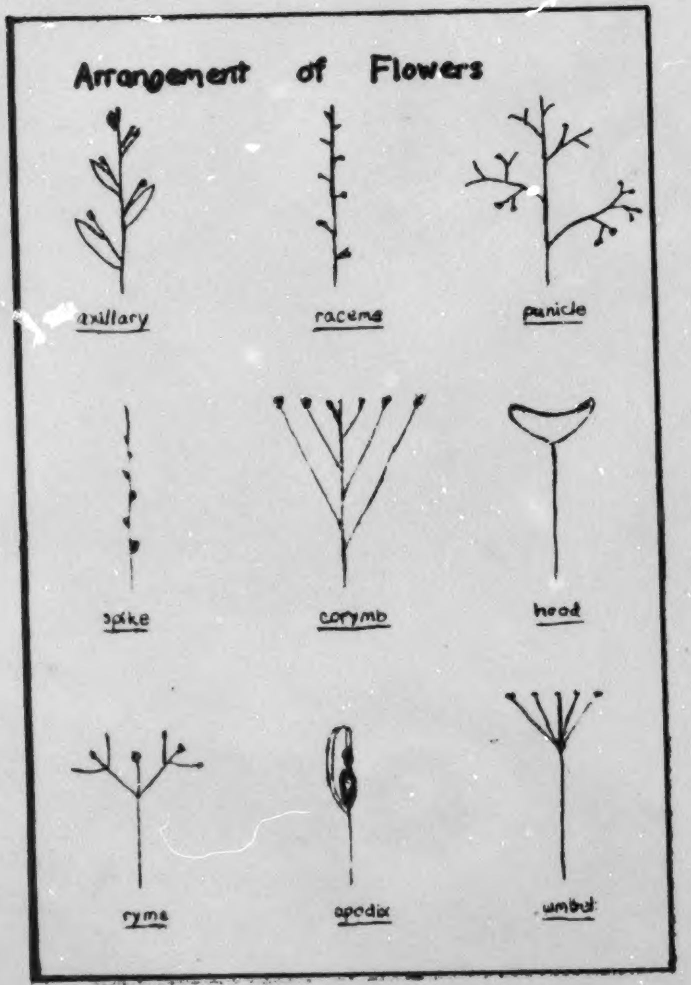
Shapes of Simple Leaves


lanceolate
ovate
cordate
elliptical
oblong
linear
auriculate
cuneate
obovate
peltate
oblanceolate
hastate
obcordate
spatulate
reniform
scale-like
awl-like
palmately lobed
pinnately lobed
needle-like

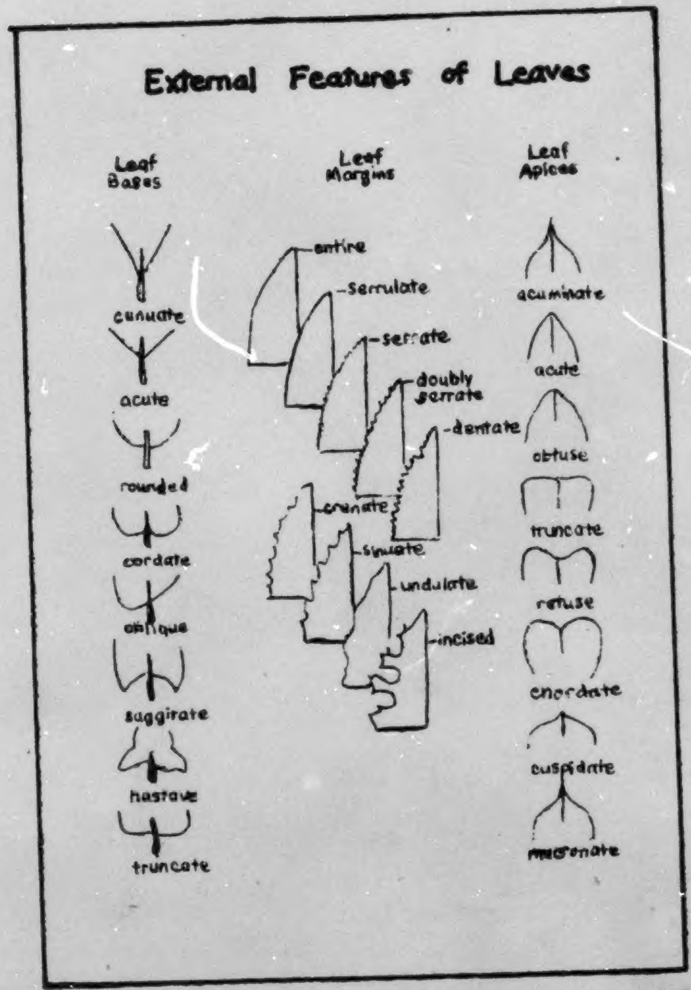
Leaf Types

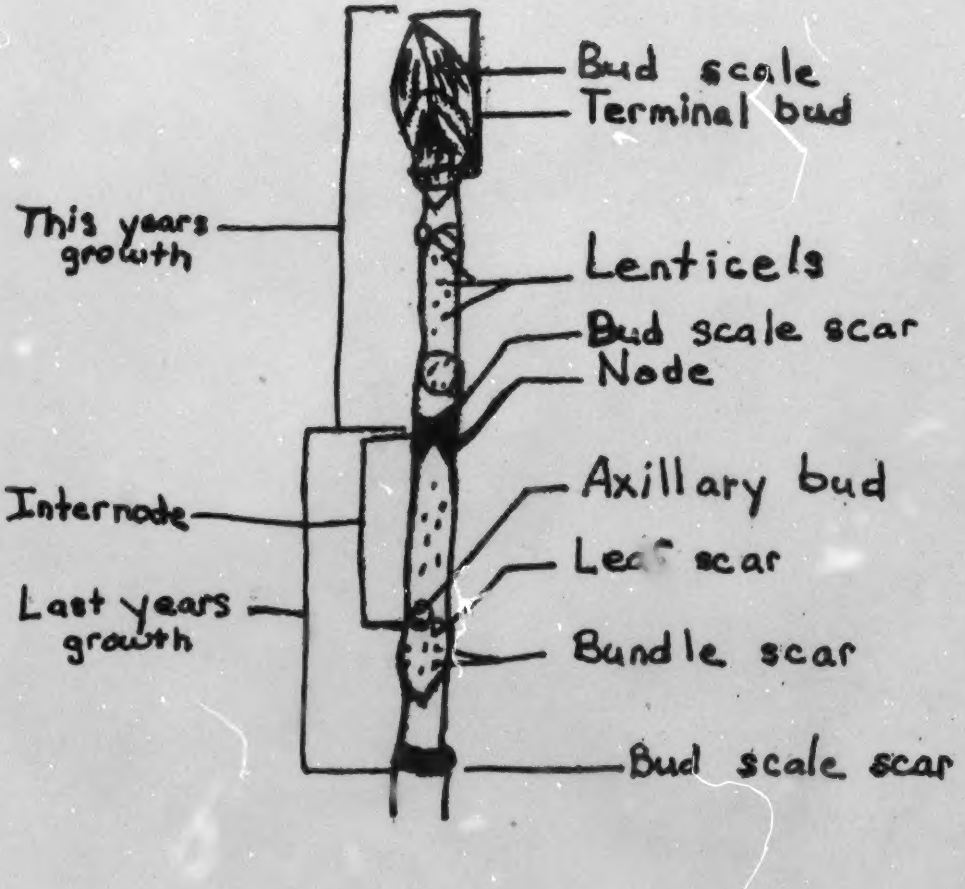

palmately compound
pinnately compound (ONCE)
pinnately compound (TWICE)
parallel venation
pinnately net venation
palmately net venation
open or dichotomous venation

Arrangement of Flowers


axillary
raceme
panicle
spike
corymb
head
cyme
spadix
umbel

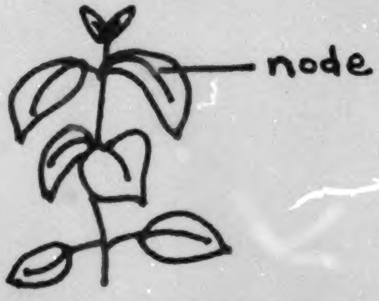
External Features of Leaves


Leaf Bases
Leaf Margins
Leaf Apices
cunuate
acute
rounded
cordate
oblique
suggirate
hastave
truncate
entire
serrulate
serrate
doubly serrate
dentate
crenate
sinuate
undulate
incised
acuminate
acute
obtuse
truncate
retuse
enordate
cuspidate
mucronate

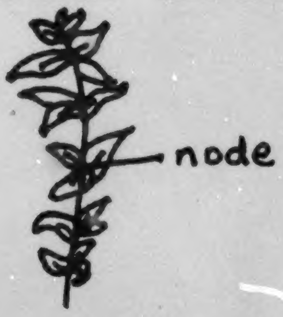

Bud scale
Terminal bud
This years growth
Lenticels
Bud scale scar
Node
Internode
Axillary bud
Leaf scar
Last years growth
Bundle scar
Bud scale scar

LEAVES

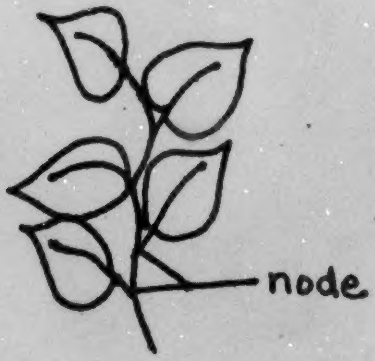
1. Opposite leaves - two leaves occurring at a node.



2. Whorled leaves - more than two leaves occur at a node.



3. alternate leaves - one leaf occurring at a node.



PLANT CLASSIFICATION

UNIT 1

GLOSSARY OF TERMS

Relating to specific plant characteristics, needs adaptations, inadequacies, and values.

HABIT - May be affected by numerous factors of the environment.

Trees - In general, plants with a single stem exceeding roughly 15-20 feet in height.

Tree shrubs - Single of multiple stem plants below 15-20 feet in height. Amelanchier sp. Syringa vulgaria.

Shrubs - Multiple stem plants. Viburnum sp. Forsythia sp.

Vines - Climbing flexible stem plants. Clematis sp., Vitis sp., Ampelopsis sp.

Ground cover - Low spreading or scrambling plants usually with a capacity to spread aggressively by vegetative means. Pachysandra terminalis, prostrate forms of Juniperus, etc.

FORM

Spreading - Pronounced leader lacking; horizontal axis exceeding vertical, Malus sargenti, Crataegus crusgaili.

Pyramidal - Triangular in outline, broadest at base. Picea abies. Quercus palustris.

Vasa - Crown triangular in outline, broadest at apex. Ulmus americana.

Columnar - Vertical axis much exceeding horizontal. Populus alba bolleana.

Upright - Vertical axis exceeding horizontal, crown broadest near or below middle. Acer saccharum.

Globe - Vertical and horizontal axes about equal. Ulmus parifolia, Ulmus carpinifolia umbraculifera.

Picturesque - Crown gracefully asymmetrical in consequence of heredity, prevailing wind, etc. Pinus strobus.

Leggy - Multiple stemmed plant devoid of foliage below. Betula popylifolia. Amelanchier sp.

MASS

Dense - Well developed branch system, heavily clothed with foliage. Acer platanoides, other shade tolerant species.

Open - Sparse branching clothed with a relatively small quantity of foliage. Gleditsia triacanthos, Phellodendron sp.

BRANCHING CHARACTER

Horizontal - Possessed of main branches oriented at near 0° to trunk of tree.

Ascending - Main branches diverging at a slight angle from the vertical, Malus baccata columnaria.

Descending - Main branches diverging from trunk at an angle below the horizontal. Quercus palustris (lower branches).

Weeping - Branch tips and twigs pendant. Solix babylonica, Malus 'Red Jade'.

Contorted - Branches ascending in spiral fashion or assuming grotesque shapes in response to environmental stresses, Corylus aveilana contorta.

GLOSSARY OF TERMS

BRANCHING TEXTURE

Bold - Prominent branches and twigs. *Gymnocladus dioicus*, *Phellodendron amurense*.

Medium - Branches, twigs of intermediate diameter. *Acer rubrum*.

Fine - Branches, twigs conspicuously slender. *Ostrya virginiana*.

LIFE SPAN

Short - Possessed of relatively short life expectancy due to genetic constitution. *Populus tremuloides*.

Long - Having the potential to endure for centuries before the onset of decadence. *Quercus alba*.

GROWTH RATE

Slow - Having an annual leader increment of around a foot or less. *Caprinus caroliniana*, *Acer palmatum*.

Rapid - Possessed of the potential to produce 4-5' or more of leader growth annually. *Populus deltoidas*.

PLANT VALUES - LIABILITIES

Poisonous - Having parts poisonous to man or livestock when contacted or ingested. *Rhus radicans*, *Kalmia angustifolia*.

Inhibits Turf - Through the casting of heavy shade or the abosorptive potential of a shallow root system. *Acer platanoides*.

Heavy Litter - In the form of massive fruits (*Juglans sp.*) expansive, decay resistant leaves (*Platanus sp.*), or copiously shed twigs and branchlets (*Salix sp.*).

Insect and Disease Prone - (In a relative sense) - *Ulmus americana*.

Sunscalds or Windburns - Includes winter damage to wood (*Lirodendron tulipifera*) or foliage (*Mahonia* or some conifers).

Hard to Transplant - The consequence of an inherent low tolerance to root disturbance. *Sassafras albidum*, *Nyssa sylvatica*.

Spreads Aggressively - Either by seed (*Ulmus americana*) or by vegetative means (*Rhus sp.*)

Needs High Moisture - Either in the air(*Sequoia sempervirens.*) or soil (*Cephalanthus occidentallis*).

Needs High Fertility - Necessary in order to achieve optimum growth rate. *Magnolia soulanglana* or *Rosa hybrids*.

Needs High Organic Soil - Typically in the form of peat or similar material; usually linked also with the need for an acid soil reaction, *Rhododendron*.

High Maintenance - Embraces all operations needed to keep the plant vigorous and its environs in tidy condition. *Rosa hyb*.

Few Sources - Refers to availability in the trade.

GLOSSARY OF TERMS

PLANT VALUES - ASSETS

Withstands Compacted Soil - With particular emphasis on tolerance to soils compacted by heavy construction equipment Ligustrum sp.

Withstands Ice, Snow, Wind - A measure of strength of wood and crotches. Quercus sp.

Withstands Air Pollution - In the form of smoke, dust, and chemcicals. Allanthus altissima.

Withstands Salt Spray - Along roadside or seashore. Pinus nigra.

Tolerates Dry Sterile Soil - Includes species capable of tolerating as well as requiring these conditions. Caragana arborescens, Amorpha canascens.

Insect and Disease Free - (Relatively) Ginkgo biloba.

Low Maintenance - Requiring little effort to keep plant and its site presentable. Cercidiphyllum japonicum.

FOLIAGE (SUMMER)

Gray - Elaeqnus angustifoila, Abies concolor.

Red Purple - Fagus sylvatica atropunicea, Acer palmatum sanguineum.

Light Green - Larix laricina, Pinus sylvestris.

Dark Green - Acer platanoides, Pinus nigra.

Yellow - Sambucus canadensis aurea, Philadelphus coronarius aureus.

Variegated - Cornus alba argenteo-marginata, Euonymus fortunai gracilis, or 'Silver Queen'.

FOLIAGE (AUTUMN)

Brown - Quercus macrocarpa.

Red - Rhus typhina, Hyssa sylvatica.

Orange - Acer saccharum.

Yellow - Hamamelis virginiana, Populus tremuloides.

Purple - Liquidamber styraciflua, Fraxinus americana.

Green - Summer foliage color retained until abcission occurs. Liqustrum vulgare.

FOLIAGE TEXTURE

Coarse - Leaf blades expansive. Platanus occidentalis.

Medium - Leaf blades about 3-5" long. Acer rubrum.

Fine - Leaf blades compact or divided. Salix sp. Gleditsia triacanthos

FOLIAGE SURFACE

Glossy - One or both blade surfaces lustrous, often leathery and evergreen or semi-evergreen. Ilex aquifolium, Buxux sempervirens, Rhus copallina.

Dull - Blade lacking luster. Viburnum carlesi.

GLOSSARY OF TERMS

FOLIAGE DURATION

Deciduous - Leaves falling in early to mid-autumn. Acer saccharum.

Persistent - Leaves losing summer color in autumn, but persisting into winter or even spring. Quercus alba.

Semi-Evergreen - Leaves retaining summer green coloration until winter freeze-up. Lonicera japanica bailiana.

Broadleaf Evergreen - Leaf blade usually leathery. Rhododendron, Bucus.

Gymosperm Evergreen - Pinus, Texus, etc.

THRONY

Thorny - Armament of any ofrm including prickles, spines, true thorns. Xenthosylum, Ribes, Cretaequa, etc.

BARK COLOR - Refers to bark of trunk and/or branchlets.

Orange - Pinus sylvestris.

Red - Cornus stolonifera, Prunus serrula.

Yellow - Cornus stolonifera flaviramea.

Green - Kerria japonica.

White - Betula papyrifera.

BARK TYPE

Mottled - Progressive exfolliation of bark flakes. Platanus, Stewartia.

Peeling - Thin strips or sheets. Vitis sp., Betula sp.

Smooth - Surface with a minumum of fussures. Fagus.

Rough - With flakes or other protuberances separated by a pattern of shallow or deep fissures. Quercus or Fraxinus.

HARDINESS ZONES - Average annual minimum temperatures.

Zone 1 - -40° to -30°
Zone 2 - -50° to -40°
Zone 3 - -40° to -30°
Zone 4 - -30° to -20°
Zone 5 - -20° to -10°
Zone 6 - -10° to - 0°
Zone 7 - 0° to 10°
Zone 8 - 10° to 20°
Zone 9 - 20° to 40°
Zone 10 - 30° to 40°

PLANT CLASSIFICATION

UNIT 1

LIST OF TERMS

1. pith -- center of twig, diamond or cylindrical.
2. axillary bud -- a bud located in the axil of a leaf.
3. leaf scar -- the scar left on a stem by a fallen leaf.
4. bundle scar -- scars left on leaf scars by broken vascular bundles that extended from the stem into the petioles of the leaves before the leaves fell.
5. accessory buds -- an additional bud; a bud in addition to the axillary bud.
6. lenticals -- multicellular structures found in the outer corky layer of stems, appearing as dots or ridges and functioning in gaseous exhange.
7. terminal bud -- buds occurring at the tips of branches.
8. node -- the part of a stem where leaves and axillary buds arise.
9. internodes -- the part of a stem between two successive nodes.
10. stipules -- one of a pair of usually small,leaflike structures borne at the base of a leaf in many plants.
11. stipular scar -- slitlike in shape, not found on all twigs, occurin in pairs on either side at the tope of the leaf scar.
12. glabrous -- without hairs, or smooth.
13. glaucous -- covered with a fine white or bluish powder, bloom.
14. globose -- shaped like a ball.
15. pubescent -- covered with hairs.
16. striate -- marked with stripes.
17. strobile -- same as cone, usually refers to immature structures.
18. sub-globose -- somewhat ball shaped.
19. bud scales -- one of the specialized leaves covering a bud.

PLANT CLASSIFICATION

UNIT 1

JOB SHEET #1: Collecting Plants from Around Your Home

Each student should collect 15 plants inside and outside their home. They will bring the plants to class so that the instructor may help them to identify the plants. Use the information included in this unit and reference books listed in the Plant Identification unit.

PLANT CLASSIFICATION

UNIT 1

JOB SHEET #2: Developing a Plant Key

Study the following plants and develop a plant key using leaf type, veination, leaf margin, leaf shape, leaf apice, leaf base, and leaf color. See reference sheets HORTI SD U1-37 to HORT SD U1-39 as an example.

1. Sugar Maple
2. Split Leaf Philodendron
3. Heartleaf Philodendron
4. Rex Begonia
5. African Violet
6. Chrysantheumum
7. Poinsettia
8. Rose
9. Rubber Plant
10. Marigold
11. Dieffenbachia
12. Bur Oak
13. Elm
14. English Ivy
15. Pin Oak
16. Red Bud
17. Crabapple
18. Lilac
19. Spirea
20. Russian Olive

PLANT CLASSIFICATION

UNIT 1

REFERENCE SHEET: Some Deciduous Trees and Shrubs of Kansas

1.	Leaves compound	2
1.	Leaves simple	12
2	Leaves more than once compound	3
2.	Leaves only once compound	4
3.	Twigs thick; pith large - pink colored; 5 bundle scars	Coffee Tree
3.	Twigs medium; zigzag; pith medium; 3 bundle scars	Honey Locust
4.	Leaves opposite	5
4.	Leaves alternate	7
5.	Leaves palmately compound (all leaflets radiating from end of stem)	Buckeye
5.	Leaves pinnately compound (leaflets arranged along each side of stem)	6
6.	Leaflet edge smooth or finely toothed	Ash
6.	Leaflet edge coarsely toothed or lobed	Box Elder
7.	With thorns	8
7.	Without thorns	9
8.	Thorns frequently branches; twigs zigzag; (leaves usually twice compound)	Honey Locust
8.	Thorns not branches; peel off with bark; twigs not zigzag; thorns short and in pairs	Black Locust
9.	Leaflet edges smooth except at base; 7 or more bundle scars	Tree of Heaven
9.	Leaflet edges toothed	10
10.	Generally 15 to 23 leaflets, pith cylindrical, chambered	Black Walnut
10.	Generally 5 to 17 leaflets, pith 5 angled	11
11.	Generally 9 to 17 leaflets, second pair of leaflets longest	Pecan
11.	Generally 5 to 11 leaflets, terminal and first pair of leaflets longest	Hickory
12.	Leaves more than one at a node (opposite)	13
12.	Leaves one at a node (alternate)	14
13.	Leaves 3 or more at some nodes; whorled; 4 to 12 inches wide	Catalpa
13.	Leaves 2 at a node; opposite, lobed, 5 pointed	Maple
14.	With thorns (may be false thorns)	15
14.	Without thorns	18
15.	Leaves and buds covered with silvery scales	Russian Olive
15.	Leaves without silver scales	16

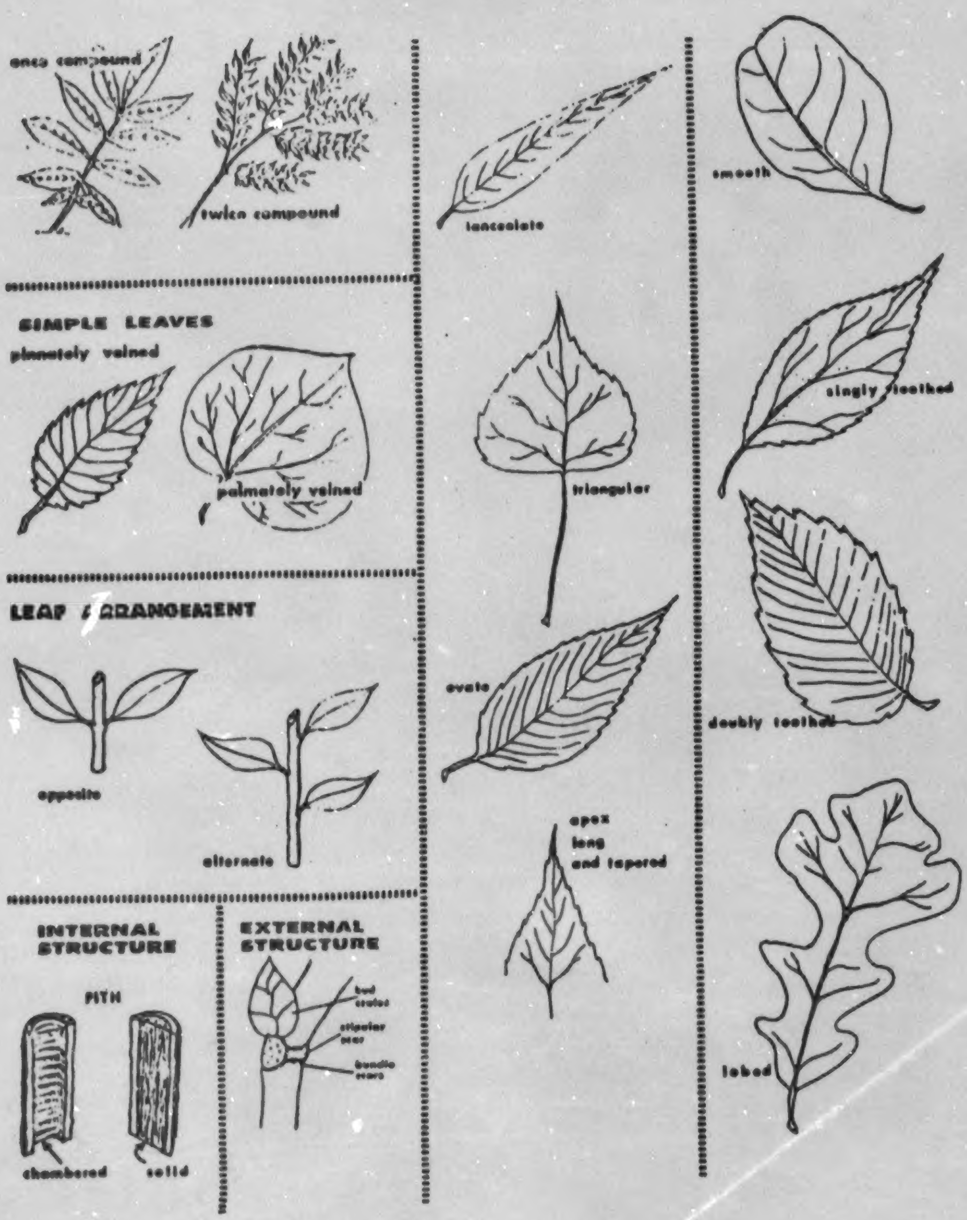
REFEREMCE SHEET

16.	Sap milky;	
16.	Sap not milky	
17.	Leaves oblong to ovate, apex long and tpaered, leaf edges finely toothed	Plum
17.	Leaves varied, leaf edges coarsely toothed	Hawthorn
18.	Leaves palmately veined	19
18.	Leaves pinnately veined	20
19.	Leaf edges smooth, leaves heart-shaped	Redbud
19.	Leaf edges toothed, leaves shallowly lobed, pointed	Sycamore
20.	Leaf edges smooth	Persimmon
20.	Leaf edges toothed or lobed	21
21.	Leaves lobed	22
21.	Leaves toothed, not lobed	24
22.	Leaves both lobed and unlobed, sap milky	Mulberry
22.	All leaves lobed clustered at tip of twig	23
23.	Lobes pointed	Black Oak
23.	Lobes rounded	Bur Oak
24.	Leaf edges doubly toothed	25
24.	Leaf edges singly toothed	27
25.	Trunk bark white or salmon pink, smooth and scaly	River Birch
25.	Bark not as above	26
26.	Inner bark reddish; leaves rough, sandpapery	Red Elm
26.	Inner bark white; leaves smooth above	White Elm
27.	Leaves large, heartshaped, often uneven at base	Basswood
27.	Leaves not as above	28
28.	Leaves ovate, light green on both sides, insect gall on underside very common	Hackberry
28.	Leaves not as above	29
29.	Leaves triangular, surfaces lustrous green	Cottonwood
29.	Not as above	30
30.	Leaves lanceolate, surfaces light green	Willow
30.	Leaves oblong to ovate, upper surface dark green	Plum or Cherry

PLANT CLASSIFICATION

UNIT 1

REFERENCE SHEET: Leaf Verification


once compound
twice compound
lanceolate
smooth
SIMPLE LEAVES
pinnately veined
palmately veined
triangular
singly toothed
LEAF ARRANGEMENT
opposite
alternate
ovate
doubly toothed
apex
long
and tapered
lobed
INTERNAL STRUCTURE
PITH
chambered
solid
EXTERNAL STRUCTURE
bud scales
stipular scar
bundle scars

PLANT CLASSIFICATION

UNIT 1

TEST

1. Match the terms on the right to the correct definitions:

_____a. Usually a long structure enclosing the seeds, such as found on a locust tree.

_____b. One segment of a compound leaf, a section of the blade.

_____c. The part of a tree above the trunk.

_____d. Losing the leaves in the autumn.

_____e. The leaflets are arranged on two sides of a central stalk.

_____f. The outer, dry portion of some nuts.

_____g. The top curved in toward the body. The teeth curved toward the leaf.

_____h. Arranged on two sides of a stem at the same level.

_____i. Tapering to a long, sharp point.

_____j. Widest below the middle and tapering to a point.

_____k. Without teeth on the edge of a leaf.

_____l. Rounded sides and pointed ends, similar to a football.

_____m. Composed of several parts. A leaf of this type has the blade divided into several smaller parts.

_____n. The ripened ovary containing the seeds.

_____o. The place on a stem where the leaves are attached.

_____p. Arranged around a center.

_____q. A dry fruit usually containing more than one seed and opening at maturity.

_____r. A one-seeded, hard, dry fruit which does not break open at maturity.

_____s. The bulky part of a fruit, often juicy.

_____t. A long cluster of many small flowers.

_____u. The flat part of a leaf.

1. Alternate
2. Angular
3. Awl-shaped
4. Blade
5. Capsule
6. Catkin
7. Compound
8. Crown
9. Deciduous
10. Elliptic
11. Entire
12. Flesh
13. Fruit
14. Husk
15. Incurved
16. Lance-shaped
17. Leaflet
18. Lobe
19. Node
20. Nut
21. Opposite
22. Palmate
23. Pinnate
24. Pod

TEST

2. List the four systems of plant classification.

A.

B.

C.

D.

3. Complete Assignment Sheet #1.

4. a. Group these crops under their Center of Origin:

Corn
Azalea
Poinsettia
Pecan
Pepper
Pftzer Juniper
Red Bud
Sugar Maple
Pot Mum
Yucca
Bittersweet
Wisteria

CENTER OF ORIGIN

CHINA	PERU	JAPAN	EASTERN U. S.	MEXICO
________	________	________	________	________
________	________	________	________	________
			________	
			________	

b. Define:

Exotic -

Indigenous -

5. Classify the following crops based on utilization:

a. Cotton ________ ________

b. Corn ________ ________ ________ ________

c. Hemp ________ ________

d. Shade Trees ________

e. Rice ________ ________

f. Peanut ________ ________

g. Coffee ________ ________

h. Carrot ________ ________

i. Sorghum ________ ________

TEST

6. Match the terms on the right to the correct definitions:

_____1. Summer Annual
_____2. Winter Annual
_____3. Biennials
_____4. Perennials

A. Requires two years to complete life cycle.
B. Complete life cycle in one growing season.
C. Have an indefinite life period.
D. Utilizes part of two growing seasons to complete life cycle.

7. Fill out Assignment Sheet #2.

8. Fill out Assignment Sheet #3.

PLANT CLASSIFICATION

UNIT 2

PLANT IDENTIFICATION AND EVALUATION

TERMINAL OBJECTIVE

Upon completion of this unit, students will be able to identify and name some common plants and/or plant parts. Students will also be able to evaluate plants and/or their fruit. This objective will be considered achieved by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, students will be able to:

1. Identify ornamental plants and/or plant parts.
2. Identify flower and foliage plants and/or seeds.
3. Identify fruit and nut specimens.
4. Identify vegetable plants, seeds, or edible portions.
5. Evaluate quality of vegetables.
6. Evaluate quality of fruits and nuts.
7. Evaluate quality of potted plants and/or cut flowers.
8. Evaluate quality of ornamental nursery stock.
9. Complete Job Sheet #1 by demonstrating the ability to preserve horticultural materials.
10. Complete Job Sheet #2 by demonstrating the ability to assemble a collection of plant materials for state and/or national contests.

Identify the Following:
Kansas Horticulture FFA Identification Contest

Flowers and Foliage
(*Seeds may be used)

1. African Violet
2. Begonia
3. Chrysanthemum
4. Coleus
5. Dieffenbachia
6. Devils Ivy
7. Geranium
8. Gladiolus
9. Hollyhock*
10. Marigold*
11. Peperomia
12. Periwinkle
13. Petunia
14. Philodendron
15. Poinsettia
16. Rose
17. Rubber Plant
18. Sansevieria
19. Snapdragon
20. Sunflower*
21. Zinnia*

Ornamentals
(Plant Parts)

22. Arborvitae
23. Ash
24. Bur Oak
25. Cottonwood
26. Elm
27. English Ivy
28. Firethorn
29. Flowering Crabapple
30. Forsythis
31. Hackberry
32. Honey Locust
33. Juniper
34. Lilac
35. Pin Oak
36. Pine
37. Privet
38. Red Bud
39. Russian Olive
40. Spirea (Van Houttei)
41. Sycamore
42. Yew
43. Bluegrass
44. Buffalograss
45. Fescue
46. Bermudagrass

Fruit and Nut Specimens
(*Shoot or Plant Part)

47. Apples - Red Delicious
48. Golden Delicious
49. Jonathan
50. Winesap
51. Apricot
52. Blackberry
53. Black Walnut*
54. Cherry (tart)*
55. English (Carpathian) walnut
56. Grape*
57. Hickory Nut
58. Peach*
59. Pear*
60. Pecan
61. Plum (European or Prune)
62. Raspberry
63. Strawberry*

Vegetables (Plants or edible portion)
(*Seeds may be used)

64. Asparagus
65. Beans (Snap)*
66. Beet (red)*
67. Broccoli
68. Cabbage*
69. Carrot*
70. Cauliflower
71. Cucumber*
72. Eggplant
73. Lettuce
74. Lima Bean*
75. Muskmelon (cantaloupe)*
76. Okra
77. Onion*
78. Parsnip
79. Peas (Green)*
80. Pepper*
81. Popcorn*
82. Potato (Irish)
83. Radish*
84. Rhubarb
85. Sweet Corn*
86. Sweetpotatoes
87. Tomatoes*
88. Turnip
89. Watermelon*

Identify the Following:

National Nursery Plant Identification

COMMON NAME	BOTANICAL NAME
Glossy Ahelia	Ablia x grandiflora
White Fir	Abies concolor
Amur Maple	Acer ginnala
Norway Maple	Acer Platanoides
Red Maple	Acer rubrum
Silk tree (Mimosa)	Albizia julibrissin
Norfolk Island Pine	Araucaria excelsa
Japanese Acuba	Aucuba japonica
Japanese Barberry	Berberis thunbergi
Brazil Bougainvillea	Bougainvillea spectabilis
Paper Birch	Betula papyrifera
Common Box	Buxux sempervirens
Heather	Calluna vulgaris
Camelia	Camelia japonica
Deodar Cedar	Cedrus deodara
American Bittersweet	Celastris scandens
Eastern Redbud	Cercis canadensis
Flowering Quince	Chaenomeles speciosa
Flowering Dogwood	Cornus florida
Pacific Dogwood	Cornus nuttallii
Rock Spray Cotoneaster	Cotoneaster horizontalis
Washington Hawthorn	Crataegus phaenopvrum
Columnar Italian Cypress	Cupressus sempervirens 'Strict
Slender Deutzia	Deutzia gracilis
Russian Olive	Eleagnus angustifolia
Autumn Eleagnus	Eleagnus unbellata
Winged Euonymus	Euonymus alatus
Wintercreeper	Euonymus fortunei
Border Forsythia	Forsythia x intermedia
Gardenia, Cape Jasmine	Gardenia jasminoides
Ginkgo, Maidenhair Tree	Ginkgo biloba
Thornless Honeylocust	Gleditsia tricanthos inermis
English Ivy	Hedera helix

National Nursery Plant Identification

COMMON NAME	BOTANICAL
Chinese Holly	Ilex cornuta
Japanese Holly	Ilex crenata
American Holly	Ilex opaca
English Holly	Ilex aquifolium
Flame of the Woods	Ixora coccinea
Common White Jasmine	Jasminum officinalis
Pfitzer Juniper	Juniperus chinensis 'Pfitzeriana'
Mountain Laurel	Kalmia latifolia
Crape Myrtle	Lagerstroemia indica
Amur Privet	Ligustrum amurense
Glossy Privet	Ligustrum lucidum
California Privet	Ligustrum ovalifolium
Sweet Gum	Liquidamber styraciflun
Tuliptree	Liriodendron tulipifera
Hall's Japanese Honeysuckle	Lonicera japonica 'Halliana'
Tatarian Honeysuckle	Lonicera tatarica
Southern Magnolia	Magnolia grandiflora
Saucer Magnolia	Magnolia soulangeana
Oregon Hollygrape	Mahonia aquifolia
Flowering Crabapple	Malus species and cv.
Bayberry	Myrica pennsylvanica
Heavenly Bamboo	Nandina domestica
Oleander	Nerium oleander
Black Gum, Black Tupelo	Nyssa sylvatica
Holly Osmanthus	Osmanthus heterophyllus
Japanese Spurge	Pachysandra terminalis
Boston Ivy	Parthenocissus tripcuspidata
Sweet Mockorange	Philadelphus coronarius
Senegal Date Palm	Phoenix reclinata
Norway Spruce	Picca abies
Colorado Spruce	Picca pungens
Japanese Andromeda	Pieris japonica
Mugo Pine	Pinus mugo mughus
Austrian Pine	Pinus nigra
Red Pine	Pinus resinosa

National Nursery Plant Identification

COMMON NAME	BOTANICAL NAME
Eastern White Pine	Pinus strobus
Scotch Pine	Pinus sylvestris
Japanese Black Pine	Pinus thumbergii
Mexican Frangipani	Plumeria rubra 'Acutifolia'
Yew Podocarpus	Podocarpus macrophylla
Thundercloud Flowering Plum	Prunus cerasifera 'Thundercloud'
Cherry Laurel	Prunus laurocerasus
Oriental Cherry	Prunus serrulata
Scarlet Firethorn	Pyrancantha coccinea
Pin Oak	Quercus palustria
Red Oak	Quercus rubra
Live Oak	Quercus virginiana
Catawba Rhododendron	Rhododendron x catawbiense
Fragrant Sumac	Rhus aromatica
Hybrid Tea Rose (cultivars)	Rosa x cv.
Rugosa Rose	Rosa rugosa
Palmetto	Sabal palmetto
California Peppertree	Schinus molle
Japanese Skimmia	Skimmia japonica
European Mountain Ash	Sorbus aucuparia
Common Lilac	Syringa vulgaris
Japanese Yew	Taxus cuspidata
American Arborvitae	Thuja occidentalis
Oriental Arborvitae	Thuja orientalis
Common Bald Cypress	Taxodium distichum
Littleleaf Linden	Tilia cordata
Canadian Hemlock	Tsuga canadensis
Arrow-wood	Viburnum dentatum
Doublefile Viburnum	Viburnum plicatum
Mexican Fan Palm	Washingtonia robusta
Chinese Wisteria	Wisteria sinensis

NATIONAL FLORAL IDENTIFICATION

COMMON NAME	BOTANICAL NAME
Bromeliad	Aechmea fasciata
Acacia	Acacia longifolia
Agapanthus	Agapanthus africanus
Ageratum	Ageratum houstonianum
Anemone	Anemone coronaria
Snapdragon	Antirrhinum majus
Anthurium	Anthurium andraenum
Aphelandra	Aphelandra squarrosa
Florist "Huckleberry"	Arctostapholos manianta
Norfolk Island Pine	Araucaria excelsa
Asparagus Fern	Asparagus plumosus
Sprengeri Fern	Asparagus sprengeri
Aspidistra	Aspidistra elatior
Tuberous Begonia	Begonia tuberhybrida
Wax Begonia	Begonia semperflorens
Bouvardia	Bouvardia hybrida
Schefflera (Octopus-tree)	Brassaia actinophyllia
Caladium	Caladium bicolor
Calendula	Calendula officinalis
China Aster	Callistephus chinensis
Camellia	Camellia japonica
Parlor Palm	Chamaedorea elegans
Marguerite Daisy	Chrysanthemum frutescens
Chrysanthemum	Chrysanthemum morifolium
Shasta Daisy	Chrysanthemum maximum
Grape Ivy	Cicus rhombifolia
Clarkia	Clarkia elegans
Croton	Codiaum variegatum
Coleus	Coleus blumei
Lily-Of-The-Valley	Convallaria majalis
Cyclamen	Cyclamen indicum
Dahlia	Dahlia variabilis
Larkspur	Delphinium ajacis

NATIONAL FLORAL IDENTIFICATION

COMMON NAME	BOTANICAL NAME
Sweet William	Dianthus barbatus
Carnation	Dianthus caryophyllus
Dumb Cane	Dieffenbachia picta
Dracena	Dracena fragraus massangeana
Heath	Erica carnea
Dollar leaf eucalyptus	Eucalyptus pulverulenta
Amazon Lily	Eucharis grandiflora
Poinsettia	Euphorbia pulcherrima
Benjamin Fig	Ficus benjamina
'Decora' Rubber Plant	Ficus elastica 'Decora'
Freesia	Freesia refracta
Fuchsia	Fuchsia hybrida
Gardenia	Gardenia jasminoides
Gerbera	Gerbera jamesoni
Gladiolus	Gladiolus hybrid
Baby's Breath	Gysophilia elegans
English Ivy	Hedera helix
Strawflower	Helichrysum bracteatum
Amaryllis	Hippeastrum vittatum
Hyacinth	Hyacinthus orientalis
Hydrangea	Hydrangea macrophylla
Rocket Candytuft	Iberis amara
Dutch Iris	Iris xyphium
Kalanchoe	Kalanchoe blossfeldiana
Tritoma	Kniphofia uvaria
Lantana	Lanta camara
Sweet Pea	Lathyrus odoratus
Easter Lily	Lilium longiflorum
Statice	Limonium sinuatum
Stock	Mathiola incana
Forget-Me-Not	Myosotis sylvatica
Daffodil	Narcissus pseudo-narcissus
Boston Fern	Nephrolepis exalata
Chincherinchee	Ornithogalum thrysoides
Cattleva Orchid	Cattleva cv.
Cymbidium Orchid	Cymbidium cv.

NATIONAL FLORAL IDENTIFICATION

COMMON NAME	BOTANICAL NAME
Cypripedium Orchid	Cypripedium cv.
Phalaenopsis Orchid	Phalaenopsis cv.
Geranium	Pelargonium hortorum
Emerald Ripple Peperomia	Peperomia caperata
Peperomia	Peperomia obtusifolia
Petunia	Petunia hybrida
Philodendron	Philodendron oxycardium
Phlox	Phlox paniculata
Butteecup	Ranunculus asiaticus
Azalea	Rhododendron indica
Hybrid Tea Rose	Rosa hybrida
Leatherleaf	Rumohra adiantiformis
African Violet	Saintpaulia ionantha
Scabiosa	Scabiosa atropurpurea
Christmas Cactus	Schlumbergera bridgesti
Golden Pothos	Scindapsus aureus
Calceolaria	Calceolaria crenatiflora
Cineraria	Senecio cruentus
Gloxinia	Sinninzia speciosa
Jerusalem Cherry	Solanum pseudocapsicum
Stephanotis	Stephanotis floribunda
Bird of Paradise	Strelitzia reginae
"Nepbthytis"	Syngonium podophyllum
Lilac	Syringa vulgaris
Marigold	Tagetes erecta
Tulip	Tulip cv.
Verbena	Verbena hortensis
Violet	Viola odorata
Pansy	Viola tricolor
Calla	Zautedeschia aethiopica
Zinnia	Zinnia elegans

PLANT CLASSIFICATION

UNIT 2

INFORMATION SHEET

HORTICULTURE JUDGING CONTEST

Group A. Judging (one crop only will be selected from each class list for the contest. Reasons are not required.)

Class 1.	Vegetables - Potatoes or Sweetpotatoes or Tomatoes . . .	100*
Class 2.	Fruit and Nuts - Apples or Pecans or Black Walnuts . . .	100*
Class 3.	Flowers - Potted Plants or Cut Flowers	100*
Class 4.	Ornamental Nursery Stock - Container Grown Plants . . .	100*
		400

Group B.	Identification.	Fifty selections will be made from the current identification list of plants or plant parts, fruits, or seeds. (5 points possible per each specimen)	250
		Possible Total Score -	650

*For example, if four plates of potatoes are set up ABCD (or 1, 2, 3, 4) and a contestant then places them ABCD his score is 100. If he places them ACDB, his score is 70. If he places them CDAB, his score is 10. If he places them DCBA, his score is 0.

In case of a tie for individual placing, the person with the highest score on identification would be the winner. In case of a team tie, the team with the highest score on identification would be awarded first place. If this does not break the tie, the team with the individual making the highest score on identification would be awarded first place.

Note: Four person teams are required for team competition. An individual may enter but only compete for high individual.

HORTI SD U2-13

INFORMATION SHEET

HORTICULTURE JUDGING CONTEST
KANSAS STATE UNIVERSITY

The contest will consist of comparative judging and identification. One team composed of two members may be entered by each school. Schools not entering a team may enter an individual. The members of teams also participate as individuals.

Judging

GROUP A

Each contestant will be required to juge four classes of horticulture crops one each from the groups listed below. Comparative placings will be made on the basis of the market value of the products. Reasons will not be required. Five minutes will be allowed for the placing of each class. Contestants are not allowed to handle specimens used to make up the classes. Any plate containing a specimen not of the species or variety named will be placed at the bottom of the class. Classes will be prepared from the following crops:

Class 1. VEGETABLES

1. Potatoes
2. Sweet Potatoes
3. Tomatoes

Class 2. FRUITS AND NUTS

1. Apples
2. Pecans
3. Black Walnuts

Class 3. FLOWERS

1. Potted Plants
2. Cut Flowers

Class 4. ORNAMENTAL NURSERY STOCK

1. Container Grown

HORTICULTURE JUDGING SCORE CARDS

When judging or preparing exhibits of horticulture products one should consider these items listed on the score cards. Materials will be observed only and not handled by contestants.

1. VEGETABLES (Tomato)

1. Condition (Freedom from disease, insect damage, dirt and mechanical injury and growth cracks)	25
2. Quality (Crisp, firm, edible)	20
3. Uniformity (Size, shape, color)	20
4. Typical of variety	20
5. Size	15
TOTAL	100

INFORMATION SHEET

II. IRISH POTATOES

1. Uniformity 20
   (Uniform as to size, shape, and color)

2. Market Size 15
   (No specimen should be less than 2 inches in diameter the shortest way)

3. Smoothness 15
   (Smooth, shallow eyed, free of second growths and clean)

4. Market Condition 20
   (Consider evidence of wilting, discolorations, firmness, freedom from sprouts, and a bright lively color)

5. Trueness to type 10
   (The different specimens should be of the same type and contain no mixture of varieties)

6. Freedom from blemish 20
   (Free from evidence of disease, insects, or mechanical injuries such as cuts, bruises, etc.)

TOTAL 100

III. SWEETPOTATOES

1. Uniformity 20
   (Uniform as to size, shape, and color)

2. Market Size 15
   (The standard U.S. No. 1 size shall not be less than 1 3/4 inches nor greater than 3 1/2 inches in diameter and should be 3 to 10 inches in length. A minimum of 4 inches in length is required in roots 2 1/4 or more inches in diameter)

3. Smoothness 15
   (Smooth, free from second growths, side rootlets, and clean)

4. Market Condition 20
   (Consider evidence of wilting, lack of firmness, discolorations, evidence of sprouting and bright lively color)

5. Trueness to type 10
   (The different specimens should be true to type and contain no mixture of varieties)

6. Freedom from blemish 20
   (Free from evidence of disease and insect or mechanical injuries such as cuts, bruises, etc.)

TOTAL 100

INFORMATION SHEET

IV. FRUIT (Apples)

1. Condition 30
(Freedom of evidence of insect or disease attacks or mechanical injuries, wilting, storage scald, or any other unsoundness which may tend to cause premature decay, and absence of stems in the case of apples or pears.)

2. Color 20
(The most acceptable commercial color shall be ranked highest. Color should be bright and lively.)

3. Size 15
(The most acceptable commercial size for the variety shall be considered ideal.)

4. Form 15
(Typical form for the variety will be considered ideal.)

5. Uniformity. 20
(Uniform as to size, shape, and color)

TOTAL 100

PECAN SEEDLING SCORE CARD
(Shelling Types)

I. General Appearance -- all pecans from same tree 5
  1. Uniform shape 1
  2. Attractive Color, clean, not polished 2
  3. Free of insect and disease damage 2

*II. Kernal percent high - 50% of better 30

III. Kernel Characteristics 20
  1. Color -- light, bright yellow exterior and interior, free of insect damage 5
  ** 2. Taste-- rich oily flavor. 5
  3. Filling --thick, plump, solid, fully developed, mature 5
  4. Texture--firm, not spongy 5

IV. Cracking Ability 15
(Base separation - high percentage whole halves)
  1. Sutures and grooves wide and shallow 10
  2. Shape of kernel, rounded ends 5

***V. Size: Medium size 3/4 inch in diameter is desired 10
(80 to 120 per pound. No penalty against over size nuts)

VI. Shape: Oblong or football shape, not round 10

VII. Shell: Thin - brittle, not split or broken 10

TOTAL 100

INFORMATION SHEET

PECAN VARIETY SCORE CARD

I.	General appearance (exterior), all same variety		30
	1. Uniform shape	10	
	2. Attractive color (clean, not polished).	10	
	3. Free of insect and disease damage	10	
II.	Kernel Characteristics		50
	1. Filling (Plump, solid, fully developed, mature)	20	
	2. Color (light-bright yellow, interior and exterior)free from insect damage	10	
	**3. Taste (rich, oily flavor)	10	
	4. Texture (firm, not spongy)	10	
III.	Shell (Thin, brittle, not split or broken)		10
IV.	Size (large for variety)		10
	TOTAL		100

*In contest to be determined by visual observation of cracked specimen, or the percent of kernels will be determined in advance and this value will be available for the use of the contestants.

**In contest to be included under color and texture.

***In contest to be determined by visual observation or the size of nuts will be determined before the contest. This value will be available for the use of the contestants.

SCALE OF POINTS FOR FLOWERING POT PLANTS (1)

Cultural Perfection	Relates to the physical appearance of the plant as witness to the skill of the grower; good balance between sizes of plant and pot: symmetrical, compact, good foliage, good appearance from all sides; freedom from deficiencies, disease and/or insect injury; strong stems; flowers uniform in development and in good condition.	40
Floriferousness	Refers not only to the number of flowers in good condition at time of judging, but also to the effect of the flowers. A smaller number of flowers so spaced as to permit their maximum development without crowding is more desirable than a larger number of flowers crowded into a tight, confused floral display	20
Size of Plant	Should be in proportion to size of pot.	20

INFORMATION SHEET

Color of Bloom	Fresh bright, no evidence of fading or browning. Free from blemishes and true to variety.	10
Size of Bloom	Consider size of individual flowers and their uniformity. Individual flowers should be as large as varietal characteristics permit without being coarse	10
	TOTAL	100

(1) From "A Manual for Flower Judging" First Edition, Nov. 1957; prepared by Pi Alpha Xi Nat. Honorary Fraternity in Floriculture & Ornamental Hort.

Scale of Points for Cut Flowers
(Multiple specimen entry)

Condition	(uniformity 10; freedom from bruise and blemish 5; substance 10)	25
Form	(uniformity 5; maturity 5; correct shape 5; regular petalage 5.)	20
Stem & Foliage	(uniformity 5; strength and/or strightness 5; foliage quality; size and proportion 5)	20
Color	(uniformity 5; intensity 5; clarity 5; trueness to variety 5)	20
Size	(uniformity 5: deduct points in relation to development and condition of oversized or undersized)	15
		100

JUDGING ORNAMENTAL NURSERY STOCK IN CONTAINERS

I. True to Type		10
II. Excellence of Physical Condition		70
A. Clean, healthy, turgid foliage and bark of good color for the species and/or Horticultural Variety (H.V.).	10	
B. Form appropriate to the species and or H.V. and of good appearance from all sides	10	
C. Well branches with strong stems typical of the species and or H.V.	10	
D. Freedom from damage of the following types -- insects, disease, mechanical, or chemical injury	15	
E. Plant size in good scale relation to the container size	10	
F. Condition of the root system related to the soil container (not pot-bound)	15	
III. Container		10
A. An appropriate, attractive, clean container in good condition.		
IV. Flowers and/or Fruit (if not present, add 5 points each to 2A and 2B)		
A. In good color and condition in season	10	
TOTAL	100	

PLANT CLASSIFICATION

UNIT 2

JOB SHEET #1: Preserving Plant Materials

1. From the Information Sheets (HORTI SD U2-19 through HORTI SD U2-22) select five different methods of preserving plant materials. Using appropriate plant materials (as listed on handouts, or found in reference books) use each of these methods in preserving the various plant materials.

2. Hand the specimens in with an explanation of how each was preserved.

PLANT CLASSIFICATION

UNIT 2

SUPPLEMENTAL INFORMATION SHEET FOR COMPLETION OF JOB SHEET #1

PRESERVING PLANT PARTS FOR DRIED ARRANGEMENTS

The best sources to collect flowers for drying or of flowers and pods already dried and waiting to be collected are from the flower, herb and vegetable gardens; from strubs, trees and vines; from roadsides, meadows, field and woods; from swamps and seashores. In fact, you can gather whereever things grow. Even the mosses and lichen will dry and prove useful.

As with farmers, so with flower arrangers; conditions have to be just right for harvest. Ideally, all plant materials for drying should be gathered on a dry day, after the morning dew has evaporated. Do not process wilted flowers, the resulting objects will not be better than those with which one starts.

For dried arrangements, start collecting as early as June and continue until fall or frost. When collecting for dried arrangements, one should gather twice the volume of plant parts than what is needed. This will compensate for the inevitable loss that will occur in the drying process.

If time permits, anyone can collect and prepare beautiful materials for creating arrangements. It is often advisable, but not necessary, to purchase exotic tropical and desert materials which do not grow locally to give that "finished touch" to your designs.

The methods for drying and preserving decorative plant parts will be described within each of these divisions:

I. Methods for Drying Flowers
III. Methods for Drying Foliages
III. Methods for Drying Seedpods, Cones, Berries, and Fungi

I. METHODS FOR DRYING FLOWERS

Basically, there are three ways to dry flowers: (a) Air drying; (b) Drying in an agent, that is burying the flowers in an absorbent preparation; and (c) Pressing. A general rule to follow is that flowers that do not wilt can be hung to dry, flowers that wilt must be dried in something supportive to preserve the form.

The flowers should be at the proper stage of development, which is generally early matruity, but this will vary according to types. Flowers must be in perfect condition, free of insects and possess pure, bright color. The brighter colors and tints dry much more brilliant than will the deeper shades and tones, which often turn to an unpleasingly dark shade or almost black. All leaves should be stripped off and blooms and stems should be free of surface moisture.

AIR DRYING - It is the easiest and most natural way to dry flowers for winter arrangements. Just tie the defoliated stems together with a rubber band to allow for shrinkage and hand heads down in a warm, dry, dark room. The flowers will take from one to four weeds to dry, depending on the thickness of the stems and the foliage texture. Plants that will dry well in this manner are: ageratum, baby's breath, bittersweet, dock, statice, strawflowers, yarror, yucca, and etc. Certain flowers such as cockscomb, elder, goldenrod, and lunaria dry better right side up with the stems thrust in sand. Any flower with a large composite head and a stiff sturdy stalk prefers the perpendicular position to keep their shape

DRYING IN AN AGENT - It is inexpensive, efficient and reusuable. Flowers that wilt must be dried in a supportive substance to preserve their form or 3-dimensional shape. These substances can be used:

(1) Sand - Is the oldest agent and least expensive. Must be dry, fine washed sand that is salt free. The major problem with sand is that it is heavy and sometimes bruises delicate petals. It takes three or four weeks for flowers to dry in sand.

(2) 1/3 Sand and 2/3 Borax - A mixture that is faster acting and a little more expensive than plain sand.

(3) 1/2 Borax and 1/2 Cornmeal - Is faster and lighter than sand but leaves a residue on the flowers.

(4) 1/2 Borax and 1/2 Hominy Grits - Is faster and lighter than sand but also leaves a residue on the flowers.

(5) Borax - Dries faster than the above substances but when used alone ther is a danger of burning or bleaching plant parts.

(6) Cat Litter - A good substance for drying large flowers and long-spike flowers. It is lightweight, inexpensive and dries the flowers fairly quickly in about a week or ten days.

(7) Silica Gel - Is more expensive but an excellent drying agent. It may be found under other trade names such as Flower-Dri, Flora-Cure, and Dryox. Drying time for silica gel is a minimum of two days, which gives you an opportunity to dry a number of batches before blooming season ends. Silica gel contains blue crystals that turn pinkish when moisture-laden, they are used as moisture meters to tell you when the medium needs drying out. Do this by spreading out in a large flat pan and placing in 250° oven for 30 minutes. When the crystals are blue again, they are ready for reuse. Keep silica gel in an airtight container at all times, particularly when using it to dry specimens.

The procedures for using any of the agents are basically the same. A container is needed to hold enough of the agent to support and cover the flowers. If the flower petals are large and heavy, an application of white glue at the base of the petals can prevent shattering after they have dried. If flowers are glued, they should be air dried overnight before placing in an agent. Stems should be cut from the flowers, leaving about one inch. A short wire of a gauge that will support the weight of the flower should be inserted in the stem.

In the container, 1/2 inch of agent and then flowers are placed either face up or face down, depending on their form. Most flowers should be placed face up, and the agent slowly sifted over the bloom. The flower should be covered with a 1/4 inch layer of agent. The container should be left in a warm, dry place for six to seven days. The container shouln't be covered (if silica gel is used, the container should be tightly closed during the drying process). When the flowers are dry, the petals should feel like taffeta. After carefully removing the flowers from the agent and dusting off excess powder with a fine artists brush, one should place the dried flowers in a covered box, in which silica gel has been sprinkled. The silica gel will protect the absorbent flowers from high humidity while being stored.

PRESSING - The third way to dry flowers. Pressed flora have a definite place in the field of designing with dried plant materials. Flower pictures have long been popular, expecially as memory pieces. Place flowers on thick layers of newspaper, spreading out so none touches another, or they will stick together. Cover with more layers of newspaper and repeat about six layers, wieght with boards or books. Two to three weeks are needed to dry.

II. METHODS OF DRYING FOLIAGES

Foliages should be chosen with the desired color in mind. If green is needed, the plant parts should be gathered in the summer when mature growth in present. Fall colored parts can be picked as they become available.

The methods for drying foliages are: (1) Air drying, (2) Pressing, (3) Glycerinizing, (4) Skeletonizing, and (5) Wax coating.

AIR DRYING - Is the easiest and best method for some foliages. Can either be cut and hung to dry or placed standing in a deep container.

PRESSING - Can preserve color and form of many leaves and ferns by this method. Ferns can be protected from becoming brittle by applying olive or vegetable oil before drying. Place leaves between layers of newspapers and weight the top with a heavy object.

GLYCERINIZING - Is the use of glycerin to preserve foliage. It results in some of the most durable and pliable of all preserved materials. A mixture of 1/3 glycerin and 2/3 water should be used. Mature foliage should be selected. Such plants as magnolia, locust, and eucalyptus absorb the solution through their stems. The stems should be pounded to a pulp to aid in absorption. Other materials absorb glycerin glycerin through the leaf surface and can be submerged. Some of these are Queen Anne's Lace, ferns and single leaves of magnolia, poplar, and palmetto. The time required to preserve the material varies according to varieties. When the foliage becomes lustrous and pliable, sufficient absorption has taken place. The solution that remains can be used again. A few drops of household disinfectant are helpful in preventing growth of bacteria.

SKELETONIZING - Is the preserving of foliage by using one quart of water to two tablespoons of lye. Perfect leaves should be chosen. The leaves should be boiled in the lye solution for 40 minutes in an enamel pan, removed immediately and rinsed in cold water. Any tissue should carefully scraped away without destroying any of the veinal network. To lighten the color, leaves can be immersed in two tablespoons bleach to one quart of water for two hours. Leaves can be left in the bleach longer if white is desired.

WAX COATING - Another way leaves can be preserved. Place leaf specimens between sheets of waxed paper with a single sheet of brown paper on top and then iron them with a heated iron. Warm wax from the paper will transfer to the leaves forming a protective coating on both sides. As soon as the leaves are cooled, lift from the papers and press overnight between pages of a heavy textbook.

III. METHODS TO DRY SEEDPODS, CONES, BERRIES, AND FUNGI

Most seedpods and cones will dry without much additional treatment. They should be cleaned and stored so that they are ready for use. When needed, a sealing agent made from a 50/50 mixture of white shellac and wood alcohol is useful in adhering material to the stalk and prevent shedding. Cattails and some plum-type materials can be dipped in shellac and alcohol or sprayed with hairspray. This thinned shellac treatment is a great help to holly, bittersweet, privet, pyracantha, hawthorn, cotoneaster and etc.

Lichen of all descriptions are attractive and often colorful. Their unusual shapes and textures give added interest in arrangements. Bract fungi are attractive. Weathered wood is useful in natural dried compositions. The appearance of wood and branches can be enchanced by adding a luster of bees wax or shoe wax.

The following is a new procedure for drying flowers devised by Mrs. Grace Rymer of Cleveland, Tennessee. This procedure uses a microwave oven for rapid drying and is described in Florafacts, July 1975.

Flowers and plant parts are prepared and placed in one of the supportive substances such as sand, Silica-Gel, kitty letter, or corn-meal and borax, as described earlier. The container is then placed in the microwave oven for about 2 to 6 minutes depending on size and complexity of the flower. In addition, a container of water is also placed in the oven to prevent excessive drying.

After removing from oven, the container is set aside for a period of time of 6 to 24 hours depending again on size and complexity of flower to allow flower to retain their shape. Flowers are then removed and wired as needed.

It is claimed that the flowers dried in this way retain a great deal more flexibility than by the usual methods.

PLANT CLASSIFICATION

UNIT 2

JOB SHEET #2: Assemble a Collection of Plant Materials From the State and/or Contests:

1. Will need a plant press to dry and press the leaves.
2. Proberly label each specimen collected, as to the plant common name, date collected, where collected and who collected the specifmen.
3. Mount each specimen on an 8½" x 11" sheet along with the label.
4. Organize your specimens in a note book and hand in.
5. A minimum of 30 specimens is required for a grade.

SAMPLE LABEL

Common Name ____________________

Scientific Name ________________

Date Collected _________________

Where Collected ________________

Collected By ___________________

(See Master Sheet)

HORTI SD U2-24

MASTER SHEET FOR JOB SHEET #2

Common Name ______________________
Scientific Name ______________________
Date Collected ______________________
Where Collected ______________________
Collected By ______________________

Common Name ______________________
Scientific Name ______________________
Date Collected ______________________
Where Collected ______________________
Collected By ______________________

Common Name ______________________
Scientific Name ______________________
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Common Name ______________________
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Common Name ______________________
Scientific Name ______________________
Date Collected ______________________
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Collected By ______________________

Common Name ______________________
Scientific Name ______________________
Date Collected ______________________
Where Collected ______________________
Collected By ______________________

HORTI SD 02-25

PLANT CLASSIFICATION
UNIT 2
TEST

Name________________________

School________________________

Identification Quiz For Questions 1 - 4

HORTICULTURE FFA IDENTIFICATION CONTEST

Contestants will be required to identify 50 kinds or varieties from the following list. Fifteen seconds per specimen will be allowed for each identification and duplications may be included. Choose proper number from list below and insert it in the blank.

NUMBER

1._____
2._____
3._____
4._____
5._____
6._____
7._____
8._____
9._____
10._____
11._____
12._____
13._____
14._____
15._____
16._____
17._____
18._____
19._____
20._____
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22._____
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31._____
32._____
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34._____
35._____
36._____
37._____
38._____
39._____
40._____
41._____
42._____
43._____
44._____
45._____
46._____
47._____
48._____
49._____
50._____

Flowers and Foliage

(*Seeds may be used)

1. African Violets
2. Begonia
3. Chrysanthemum
4. Coleus
5. Dieffenbachia
6. Devils Ivy
7. Geranium
8. Gladiolus
9. Hollyhock*
10. Marigold*
11. Peperomia
12. Periwinkle
13. Petunia*
14. Philodendron
15. Poinsettia
16. Rose
17. Rubber Plant
18. Sansevieria
19. Snapdragon
20. Sunflower*
21. Zinia*

Ornamentals

(Plant Parts)

22. Arborvitae
23. Ash
24. Bur Oak
25. Cottonwood
26. Elm
27. English Ivy
28. Firethorn
29. Flowering Crabapple
30. Forsythia
31. Hackberry
32. Honey Locust
33. Juniper
34. Lilac
35. Pin Oak
36. Pine
37. Privit
38. Red Bud
39. Russian Oliv
40. Spirea (Van Houttei)
41. Sycamore
42. Yew
43. Bluegrass
44. Buffalograss
45. Fescue
46. Bermudagrass

Fruit and Nut Specimens

(*Shoot or Plant Part)

47. Apples - Red Delicious
48. Golden Delicious
49. Jonathan
50. Winesap
51. Apricot
52. Blackberry
53. Black walnut*
54. Cherry (tart)*
55. English (Carpathian) walnut
56. Grape*
57. Hickory Nut
58. Peach*
59. Pear*
60. Pecan*
61. Plum (European or Prune)
62. Raspberry
63. Strawberry*

Vegetables (Plants or edible portio

(*Seeds may be used)

64. Asparagus
65. Beans (Snap)*
66. Beet (red)*
67. Broccoli
68. Cabbage*
69. Carrot*
70. Cauliflower
71. Cucumber*
72. Eggplant
73. Lettuce
74. Lima Bean*
75. Muskmelon (cantaloupe)*
76. Okra
77. Onion*
78. Parsnip
79. Peas (Green)*
80. Pepper*
81. Popcorn*
82. Potato (Irish)
83. Radish*
84. Rhubarb
85. Sweet Corn*
86. Sweetpotatoes
87. Tomatoes*
88. Turnip
89. Watermelon*

TEST

Identification Quiz For Questions 1 - 4

NURSERY PLANT IDENTIFICATION　　Form 14

Contestant Name ______________________ Contestant Number __________

COMMON NAME	BOTANICAL NAME	NUMBER	SCORE
Glossy Abelia	Ablia x grandiflora		
White Fir	Abies concolor		
Amur Maple	Acer ginnala		
Norway Maple	Acer platanoides		
Red Maple	Acer rubrum		
Silktree(Mimosa)	Albizia julibrissin		
Norfolk Island Pine	Araucaria excelsa		
Japanese Aucuba	Aucuba japonica		
Japanese Barberry	Berberis thunbergii		
Brazil Bougainvillea	Bougainvillea spectabilis		
Paper Birch	Betula papyrifera		
Common Box	Buxus sempervirens		
Heather	Calluna vulgaris		
Camellia	Camellia japonica		
Deodar Cedar	Cedrus deodara		
American Bittersweet	Celastris scandens		
Eastern Redbud	Cercis canadensis		
Flowering Quince	Chaenomeles speciosa		
Flowering Dogwood	Cornus florida		
Pacific Dogwood	Cornus nuttallii		
Rock Spray Cotoneaster	Cotoneaster horizontalis		
Washington Hawthorn	Crataegus phaenopyrum		
Columnar Italian Cypress	Cupressus sempervirens'Stricta'		
Slender Deutzia	Deutzia gracilis		
Russian Olive	Eleagnus angustifolia		
Autumn Eleagnus	Eleagnus umbellata		
Winged Euonymus	Euonymus alatus		
Wintercreeper	Euonymus fortunei		
Border Forsythia	Forsythia x intermedia		
Gardenia, Cape Jasmine	Gardenia jasminoides		
Ginkgo, Maidenhair Tree	Ginkgo biloba		
Thornless Honeylocust	Gleditsia tricanthos inermis		
English Ivy	Hedera helix		

TEST

Identification Quiz For Questions 1 - 4

Form 14
Page 2

NURSERY PLANT IDENTIFICATION

COMMON NAME	BOTANICAL	NUMBER	SCORE
Chinese Holly	Ilex cornuta		
Japanese Holly	Ilex crenata		
American Holly	Ilex opaca		
English Holly	Ilex aquifolium		
Flame of the Woods	Ixora coccinea		
Common White Jasmine	Jasminum officinalis		
Pfitzer Juniper	Juniperus chinensis 'Pfitzeriana'		
Mountain Laurel	Kalmia latifolia		
Crape Myrtle	Lagerstroemia indica		
Amur Privet	Ligustrum amurense		
Glossy Privet	Ligustrum lucidum		
California Privet	Ligustrum ovalifolium		
Sweet Gum	Liquidambar styraciflua		
Tuliptree	Liriodendron tulipifera		
Hall's Japanese Honeysuckle	Lonicera japonica 'Halliana'		
Tatarian Honeysuckle	Lonicera tatarica		
Southern Magnolia	Magnolia grandiflora		
Saucer Magnolia	Magnolia soulangeana		
Oregon Hollygrape	Mahonia aquifolia		
Flowering Crabapple	Malus species and cv.		
Bayberry	Myrica pensylvania		
Heavenly Bamboo	Nandina domestica		
Oleander	Nerium oleander		
Black Gum, Black Tupelo	Nyssa sylvatica		
Holly Osmanthus	Osmanthus heterophyllus		
Japanese Spurge	Pachysandra terminalis		
Boston Ivy	Parthenocissus tricuspidata		
Sweet Mockorange	Philadelphus coronarius		
Senegal Date Palm	Phoenix reclinata		
Norway Spruce	Picea abies		
Colorado Spruce	Picea pungens		
Japanese Andromeda	Pieris japonica		
Mugo Pine	Pinus mugo mughus		
Austrian Pine	Pinus nigra		
Red Pine	Pinus resinosa		

TEST

Identification Quiz For Questions 1 - 4

NURSERY PLANT IDENTIFICATION

Form 14
Page 3

COMMON NAME	BOTANICAL	NUMBER	SCORE
Eastern White Pine	Pinus strobus		
Scotch Pine	Pinus sylvestris		
Japanese Black Pine	Pinus thunbergii		
Mexican Frangipani	Plumeria rubra'Acutifolia'		
Yew Podocarpus	Podocarpus macrophylla		
Thundercloud Flowering Plum	Prunus cerasifera'Thundercloud'		
Cherry Laurel	Prunus laurocerasus		
Oriental Cherry	Prunus serrulata		
Scarlet Firethorn	Pyracantha coccinea		
Pin Oak	Quercus palustris		
Red Oak	Quercus rubra		
Live Oak	Quercus virginiana		
Catawba Rhododendron	Rhododenderon x catawbiense		
Fragrant Sumac	Rhus aromatica		
Hybrid Tea Rose (cultivars)	Rosa x cv.		
Rugosa Rose	Rosa rugosa		
Palmetto	Sabal palmetto		
California Peppertree	Schinus molle		
Japanese Skimmia	Skimmia japonica		
European Mountain Ash	Sorbus aucuparia		
Common Lilac	Syringa vulgaris		
Japanese Yew	Taxus cuspidata		
American Arborvitae	Thuja occidentalis		
Oriental Arborvitae	Thuja orientalis		
Common Bald Cypress	Taxodium distichum		
Littleleaf Linden	Tilia cordata		
Canadian Hemlock	Tsuga canadensis		
Arrowwood	Viburnum dentatum		
Doublefile Viburnum	Viburnum plicatum		
Mexican Fan Palm	Washingtonia robusta		
Chinese Wisteria	Wisteria sinensis		

TEST

Identification Quiz For Questions 1 - 4

FLORAL IDENTIFICATION

Form 15

Contestant Name ______________________ Contestant Number __________

COMMON NAME	BOTANICAL NAME	NUMBER	SCORE
Bromeliad	Aechmea fasciata		
Acacia	Acacia longifolia		
Agapanthus	Agapanthus africanus		
Ageratum	Ageratum houstonianum		
Anemone	Anemone coronaria		
Snapdragon	Antirrhinum majus		
Anthurium	Anthurium andraeanum		
Aphelandra	Aphelandra squarrosa		
Florist"Huckleberry"	Arctostapholos manianta		
Norfolk Island Pine	Araucaria excelsa		
Asparagus Fern	Asparagus plumosus		
Sprengeri Fern	Asparagus sprengeri		
Aspidistra	Aspidistra elatior		
Tuberous Begonia	Begonia tuberhybrida		
Wax Begonia	Begonia semperflorens		
Bouvardia	Bouvardia hybrida		
Schefflera (Octopus-tree)	Brassaia actinophyllia		
Caladium	Caladium bicolor		
Calendula	Calendula officinalis		
China Aster	Callistephus chinensis		
Camellia	Camellia japonica		
Parlor Palm	Chamaedorea elegans		
Marguerite Daisy	Chrysanthemum frutescens		
Chrysanthemum	Chrysanthemum morifolium		
Shasta Daisy	Chrysanthemum maximum		
Grape Ivy	Cicus rhombifolia		
Clarkia	Clarkia elegans		
Croton	Codiaeum variegatum		
Coleus	Coleus blumei		
Lily-Of-The-Valley	Convallaria majalis		
Cyclamen	Cyclamen indicum		
Dahlia	Dahlia variabilis		
Larkspur	Delphinium ajacis		

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TEST

Identification Quiz For Questions 1 - 4

Form 15
Page 2

FLORAL IDENTIFICATION

COMMON NAME	BOTANICAL NAME	NUMBER	SCORE
Sweet William	Dianthus barbatus		
Carnation	Dianthus caryophyllus		
Dumb Cane	Dieffenbachia picta		
Dracena	Dracena fragraus massangeana		
Heath	Erica carnea		
Dollar leaf Eucalyptus	Eucalyptus pulverulenta		
Amazon Lily	Eucharis grandiflora		
Poinsettia	Euphorbia pulcherrima		
Benjamin Fig	Ficus benjamina		
'Decora' Rubber Plant	Ficus elastica 'Decora'		
Freesia	Freesia refracta		
Fuchsia	Fuchsia hybrida		
Gardenia	Gardenia jasminoides		
Gerbera	Gerbera jamesoni		
Gladiolus	Gladiolus hybrid		
Baby's Breath	Gysophilia elegans		
English Ivy	Hedera helix		
Strawflower	Helichrysum bracteatum		
Amaryllis	Hippeastrum vittatum		
Hyacinth	Hyacinthus orientalis		
Hydrangea	Hydrangea macrophylla		
Rocket Candytuft	Iberis amara		
Dutch Iris	Iris xyphium		
Kalanchoe	Kalanchoe blossfeldiana		
Tritoma	Kniphofia uvaria		
Lantana	Lanta camara		
Sweet Pea	Lathyrus odoratus		
Easter Lily	Lilium longiflorum		
Statice	Limonium sinuatum		
Stock	Matthiola incana		
Forget-Me-Not	Myosotis sylvatica		
Daffodil	Narcissus pseudo-narcissus		
Boston Fern	Nephrolepis exaltata		
Chincherinchee	Ornithogalum thyrsoides		
Cattieva Orchid	Cattleva cv.		
Cymbidium Orchid	Cymbidium cv.		

TEST

Identification Quiz for Questions 1 - 4

FLORAL IDENTIFICATION

Form 15
Page 3

COMMON NAME	BOTANICAL NAME	NUMBER	SCORE
Cypripedium Orchid	Cypripedium cv.		
Phalaenopsis Orchid	Phalaenopsis cv.		
Geranium	Pelargonium hortorum		
Emerald Ripple Peperomia	Peperomia caperata		
Peperomia	Peperomia obtusifolia		
Petunia	Petunia hybrida		
Philodendron	Philodendron oxycardium		
Phlox	Phlox paniculata		
Buttercup	Ranunculus asiaticus		
Azalea	Rhododendron indica		
Hybrid Tea Rose	Rosa hybrida		
Leatherleaf	Rumohra adiantiformis		
African Violet	Saintpaulia ionantha		
Scabiosa	Scabiosa atropurpurea		
Christmas Cactus	Schlumberkera bridgesii		
Golden Pothos	Scindapsus aureus		
Calceolaria	Calceolaria crenatiflora		
Cineraria	Senecio cruentus		
Gloxinia	Sinningia speciosa		
Jerusalem Cherry	Solanum pseudocapsicum		
Stephanotis	Stephanotis floribunda		
Bird of Paradise	Strelitzia reginae		
"Nephthytis"	Syngonium podophyllum		
Lilac	Syringa vulgaris		
Marigold	Tagetes erecta		
Tulip	Tulip cv.		
Verbena	Verbena hortensis		
Violet	Viola odorata		
Pansy	Viola tricolor		
Calla	Zantedeschia aethiopica		
Zinnia	Zinnia elegans		

TEST

Identification Quiz For Questions 1 - 4

Floral Identification

Form 15

Contestant Name ____________________ **Contestant Number** ____________

No.	COMMON NAME / TECHNICAL NAME
	Achmea / *Achmea fasciata*
	Ageratum / *Ageratum houstonianum*
	Snapdragon / *Antirrhinum majus*
	Anthurium / *Anthurium andraeanum*
	Aphelandra, Zebra Plant / *Aphelandra squarrosa*
	Florist "Huckleberry" / *Arctostapholos manitana*
	Norfolk Island Pine / *Araucaria heterophylla*
	Asparagus "Fern" / *Asparagus plumosus*
	Sprengeri "Fern" / *Asparagus sprengeri*
	Tuberous Begonia / *Begonia tuberhybrida*
	Wax Begonia / *Begonia semperflorens*
	Shrimp Plant / *Beloperone guttata*
	Schefflera, Octopus Tree / *Brassaia actinophylla*
	Cabbage / *Brassica oleracea capitata*
	Caladium / *Caladium bicolor*
	Pocketbook Plant / *Calceolaria crenatiflora*
	China Aster / *Callistephus chinensis*
	Camellia / *Camellia japonica*
	Parlor Palm / *Chamaedorea elegans*
	Green Pepper / *Capsicum annuum*
	Cattleya Orchid / *Cattleya cv.*
	Spider Plant / *Chlorophytum commosum*
	Marguerite Daisy / *Chrysanthemum frutescens*
	Chrysanthemum / *Chrysanthemum morifolium*
	Shasta Daisy / *Chrysanthemum maximum*
	Grape Ivy / *Cissus rhombifolia*
	Croton / *Codiaeum variegatum*
	Coleus / *Coleum blumei*
	Jade Plant / *Crassula argentea*
	Cyclamen / *Cyclamen indicum*
	Cymbidium Orchid / *Cymbidium cv.*
	Carnation / *Dianthus caryophyllus*
	Dumb Cane / *Dieffenbachia picta*
	Corn Plant Dracaena / *Dracaena fragrans massangeana*
	Red Edge Dracaena / *Dracaena marginata*
	Heath / *Erica carnea*
	Dollarleaf Eucalyptus / *Ecualyptus pulverulenta*
	Poinsettia / *Euphorbia pulcherrima*
	Crown of Thorns / *Euphorbia splendens*
	Benjamin Fig / *Ficus benjamina*
	'Decora' Rubber Plant / *Ficus elastica 'Decora'*
	Freesia / *Freesia refracta*
	Fuchsia / *Fuchsia hybrida*
	Gardenia / *Gardenia jasminiodes*
	Gladiolus / *Gladiolus hybrida*
	Velvet Plant / *Gynura aurantiaca*
	Baby's Breath / *Gypsophila elegans*
	English Ivy / *Hedera helix*
	Straw flower / *Helichrysum bracteatum*
	Baby's Tears / *Helxine soleirolii*

No.	COMMON NAME / TECHNICAL NAME
	Amaryllis / *Hippeastrum vittatum*
	Wax Plant / *Hoya carnosa*
	Hyacinth / *Hyacinthus orientalis*
	Hydrangea / *Hydrangea macrophylla*
	Polka-Dot Plant / *Hypoestes sanguinolenta*
	Impatiens / *Impatiens walleriana sultani*
	Dutch Iris / *Iris xyphium*
	Kalanchoe / *Kalanchoe blo[illegible]*
	Easter Lily / *Lilium longiflor[illegible]*
	Statice / *Limonium sinuatum*
	Tomato / *Lycopersicum esculentum*
	Prayer Plant / *Maranta kerchoveana*
	Stock / *Matthiola incana*
	Cutleaf "Philodendron" / *Monstera deliciosa*
	Daffodil / *Narcissus pseudo-narcissus*
	Boston Fern / *Nephrolepis exaltata*
	Cypripedium Orchid / *Paphiopedilum cv.*
	Phalaenopsis Orchid / *Phalaenopsis cv.*
	Geranium / *Pelargonium hortorum*
	Ivy Geranium / *Pelargonium peltatum*
	Emerald Ripple Peperomia / *Peperomia caperata*
	Variegated Peperomia / *Peperomia obtusifolia variegata*
	Petunia / *Petunia hybrida*
	Heartleaf Philodendron / *Philodendron oxycardium*
	Aluminum Plant / *Pilea cadierei*
	Swedish Ivy / *Plectranthus australis*
	Golden Pothos, Devil's Ivy / *Rhaphidophora aurea*
	Easter Cactus / *Rhipsalidopsis cv.*
	Azalea / *Rhododendron cv.*
	Hybrid Tea Rose / *Rosa hybrida*
	Leatherleaf Fern / *Rumohra adiantiformis*
	African Violet / *Saintpaulia ionantha*
	Snake Plant / *Sansevieria trifasciata*
	Birdsnest Snake Plant / *Sansevieria trifasciata 'Hahni'*
	Strawberry "Begonia" / *Saxifraga sarmentosa*
	Christmas Cactus / *Schlumbergia bridgesii*
	Cineraria / *Senecio cruentus*
	German Ivy / *Senecio mikanioides*
	Gloxinia / *Sinningia speciosa*
	Jerusalem Cherry / *Solanum pseudocapsicum*
	Stephanotis / *Stephanotis floribunda*
	Bird of Paradise / *Strelitzia reginae*
	"Nephthytis" / *Syngonium podophyllum*
	Marigold / *Tagetes erecta*
	Pick-a-Back Plant / *Tolmeia menziesii*
	Tulip / *Tulipa cv.*
	Pansy / *Viola tricolor*
	Calla / *Zantedeschia aethiopica*
	Wandering Jew / *Zebrina pendula*
	Zinnia / *Zinnia elegans*

PLANT CLASSIFICATION

UNIT 2

TEST

5. Indicate which of the following statements are True and which are False.

__________A. A contestant may handle the specimens in a contest if it is necessary to see the specimen more clearly.

__________B. Any plate containing a specimen not of the species or variety named will be placed at the bottom of the class.

__________C. Injury caused by mechanical damage is not taken into consideration when judging potatoes.

__________D. When placing a class of apples uniformity is a major factor.

__________E. Stems on apples should be removed because they will puncture holes in the other apples.

__________F. Stems on tomatoes may be removed without damaging the tomatoes.

__________G. A potato which has been sun scalded should be severely faulted and placed to the bottom of the class.

__________H. Flower blooms which are past their prime are to be severely faulted.

__________I. Condition of the foliage is of little importance in evaluating ornamental nursery stock.

__________J. A plate of large sweet potatoes is always placed over a plate of smaller sweet potatoes.

6. A. Floriferousness refers to:

1.
2.

B. List four examples of cultural perfection in evaluating flowering pot plants or cut flowers.

1.
2.
3.
4.

C. List four examples of cultural perfection in evaluating fruits and vegetables.

1.
2.
3.
4.

7. List three items necessary for cultural perfection in evaluating ornamental nursery stock in containers.

A.
B.
C.

8. In evaluating the exterior quality of pecans and/or walnuts list two items necessary for cultural perfection.

A.
B.

PLANT GROWTH AND DEVELOPMENT

UNIT 1

PLANT PARTS: STRUCTURE AND FUNCTION

TERMINAL OBJECTIVE

Upon completion of this unit, students will be able to name or define major parts of plants; to list the major functions of each part; and to identify terminology that relates to plant parts. This objective will be considered achieved by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, students will be able to:

1. Match definitions with terms that relate to plant parts.
2. Match names of four basic plant parts with appropriate functions of each part.
3. Match names of three major specialized plant tissues with their functions.
4. Identify four types of roots.
5. State the function of hair roots (root hairs).
6. Name at least five types of stems with the major functions of all stems.
7. Match names of three leaf tissues with their functions.
8. Match names of three modified leaves with their functions.
9. Match names of four basic parts of a flower with their function.
10. Distinguish between a complete and an incomplete flower.
11. Match the names of two basic kinds of seedling plants with examples.

PLANT GROWTH AND DEVELOPMENT

UNIT 1

INFORMATION SHEET

I. Terms and Definitions:

A. Apetalous - Flower with no petals

B. Bracts - Modified leaves sometimes take the place of petals

C. Cambium - Cells responsible for growth of plant in diameter

D. Chlorophyll - The green vegetable pigment of plants essential in the process of photosynthesis

E. Dicot - Plant that produces two seed leaves (e.g. bean)

F. Epidermis - A covering layer usually one cell thick, found on the surfaces of all plant parts

G. Monocot - Plant that produces one seed leaf (e.g. corn)

H. Petals - Flower part: attracts pollen bearers. (See TM 4)

I. Petiole - The slender stalk by which a leaf is attached to a stem

J. Phloem - A complex tissue (bark) made of cells that transport manufactured compounds

K. Photosynthesis - The process by which plants form carbohydrates from carbon dioxide (CO_2) and water (H_2O) through the agency of sunlight acting upon chlorophyll

$$6CO_2 + 12H_2O \xrightarrow[\text{sunlight}]{\text{cholorphyll}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

L. Pistil - Flower part; produces ovule (female)

M. Pistillate - Flower with functional pistil, non-functional stamens

N. Respiration - The taking in of oxygen (O_2), the giving off of carbon dioxide (CO_2), and the releasing of energy for plant use

O. Scales - Modified leaf; hard layered covering to protect buds in winter

P. Sepal - Flower part; protects stamens and pistils in bud state (See TM 4)

Q. Stamen - Flower part; produces pollen (male). (See TM 4)

R. Staminate - Flower with functional stamen, non-functional pistil

S. Stomate - An opening in the epidermis of the leaf through which gasses, carbon dioxide, oxygen, and water vapor enter and exit the plant (See TM 3)

T. Tendril - Modified leaf; slender, threadlike structures that twine

U. Transpiration - Loss of water vapor through the leaves

V. Xylem - A complex tissue (wood) made of cells that transport water and give rigidity to stems

W. Mesophyll Tissue - Tissue containing chlorophyll cells (See TM 3)

X. Cotyledon - The primary leaf or leaves in the embryo

Y. Thorn - A modified leaf

Z. Dioecious flower - A flower with both male and female organs present

INFORMATION SHEET

in the same flower

AA. Monoecious flower - A flower which has on one of the sexual organs present

BB. Fruit - a ripened ovary.

II. Basic Plant Parts and Functions

  A. Root

    1. Absorbs water and minerals
    2. Stores food
    3. Anchors plants
    4. Conduction

  B. Stem

    1. Supports leaves and displays them to light
    2. Aids in manufacturing food
    3. Serves as food storage areas
    4. Conduction

  C. Leaf

    1. Manufactures food for plant (through photosynthesis)
    2. Tranpiration takes place here.
    3. Exchanges gases with atmosphere in the process of respiration and photosynthesis.
    4. Food storage.

  D. Flower

    1. Organs specialized for sexual reproduction
    2. Produces seed and fruit.

III. Specialized Plant Tissues and Functions

  A. Cambium

    1. Found in roots and stems between phloem and xylem
    2. Responsible for growth in diameter.
    3. Cells divide rapidly - important in budding and grafting

  B. Phloem

    1. Transports manufactured foods downward from leaves to stem and roots
    2. Protected by corky tissue.
    3. Phloem plus corky tissue constitute bark

INFORMATION SHEET

C. Xylem

1. Complex tissue (such as wood)
2. Transports water and essential raw materials upward from roots to stem and leaves
3. Gives rigidity to stems
4. Accounts for annula rings (in spring wood consists of larger cells with thinner walls; thus it appears lighter colored and less dense than summer wood.)

IV. Types and Functions of Roots (See TM 1)

A. Tap Root (e.g. carrot)

1. Continuation of primary root
2. Ideal for anchorage
3. Reaches water deeper in ground than fibrous roots
4. Is thick, fleshy and serves as an underground storehouse

B. Fibrous Root (e.g. grass)

1. Primary root is surpassed by the growth of its branches-secondary roots
2. Usually shallow; spread through a large area of soil
3. Absorbs water and minerals efficiently
4. Anchors soil particles from erosion

C. Aerial Roots

1. Anchoring Air Roots (e.g. English Ivy, Boston Ivy, Virginia Creeper) - very short roots that grow out horizontally from stem and fasten plant to a support
2. Absorptive Air Roots (e.g. tropical orchids) - most have thick outer covering of dead tissue that absorbs and stores water

D. Aquatic Roots (e.g. water lilies) - have the ability to absorb oxygen and minerals from the water

E. Adventitious Roots (e.g. roots on a rooted cutting) - roots that arise from places other than the primary root

V. Hair Roots and Function

A. A hair root (or root hair) is a slender, tubular extension of the outermost cells of the root, each one representing a single cell

B. Root hairs are found primarily on the part of the root where vascular tissues have not yet formed, or are just beginning to form

C. The function of the root hair is to aid in absorption of water and raw material

D. Most root hairs are easily damaged and short-lived

INFORMATION SHEET

VI. Types and Functions of Stems

A. Some principal types of stems are:

1. Corm - A bulb-like, solid, fleshy, scale-covered enlargement, usually of the underground stem
2. Bulb - Any of several disc-like underground stems that are attached to a cluster of thickened, scale-like leaves
3. Tuber - A short, thickened portion of an underground stem
4. Crown - portion of the stem just above and below the ground line (e.g. strawberries and asparagus.)
5. Spurs - compressed stems of woody plants adapted for fruit production (e.g. pears.)
6. Rhizome - A stem that grows horizontally under the soil surface; like a root. Has well-developed nodes and internodes
7. Stolon - a stem that grows horizontally above the soil surface (e.g. bermuda grass, zoysia grass)

B. The major functions of all stems are leaf support, food storage, propagation and conduction

VII. Principal Leaf Tissues and Functions

A. Epidermis - Consists of protective cells and guard cells and stomates

1. Function of protective cells - To keep water within the plant parts
2. Function of guard cells and stomates - To allow carbon dioxide (CO_2) to enter the leaf and oxygen (O_2) to be given off.

B. Mesophyll Tissue - Tissues containing chlorophyll cells of two types: elongated (palisade) and round (spongy).

1. Function - The food manufacturing region of the leaf

C. Veins - Channels in the tissue; of two types: Xylem and Phloem

1. Function of Phloem tissue - Conducts food from the manufacturing cells
2. Function of Xylem tissue - Conducts water and raw materials to the manufacturing cells.
3. An additional function of each is support of the leaf

VIII. Modified Leaves and Functions

A. Scales - Hard, layered structures (e.g. Juniper test)

1. Function - Protection of wood plants during winter.

B. Bracts - Leafy (as in dogwood or poinsettia), or fleshy (as in Globe artichoke)

[illegible] Function of leafy bracts - Help promote propagation by attracting pollen bearers

INFORMATION SHEET

2. Function of fleshy bracts - Store nourishment for the plant seed

C. Tendrils - Slender, threadlike sturctures that can twine (e.g. upper leaflets of a garden pea)

1. Function - Support of plant

D. Thorns (e.g. Cacti)

E. Sacs (e.g. pitcher plant, sundews, Venus fly-trap)

1. Functions - To hold water and catch insects (insects supplement food made in photosynthesis)

IX. Parts of a Flower and Functions.

A. Sepal (many sepals together called calyx)

1. Function - Protects stamens and pistils (see below) in bud stage

B. Petal (many petals together called corolla)

1. Functions:

a. Protects stamens and pistils in bud stage

b. Attracts polleh bearers by high color

C. Stamens (consists of a stalk called filament, and a pollen sac called an anther - also known as the male organ of the flower.)

1. Function - Produces pollen when, in time, contains sperm

D. Pistils (consist of an enlarged portion at base, called ovary; a flattened portion at apex, called stigma; and a connecting tissue between the ovary and stigma, called style - also known as the female organ of the flower)

1. Function of ovary - Produces ovules which will develop into seeds when fertilized

2. Function of stigma - Catches and holds pollen; has sticky surface

3. Function of style - Connects ovary and stigma

E. Receptacle - Located at base of flower (fruit of strawberry is a greatly enlarged receptacle.)

X. Complete and Incomplete Flowers

A. Complete Flower - A complete flower has all four of the main parts of a flower - sepals, petals, stamens, and pistils

B. Incomplete Flower - An incomplete flower is one that does not have all four of the main parts of a flower.

1. Apetalous flower - Has no petals.

2. Staminate flower - Has stamens that function, but pistils that do not function.

3. Pistillate flower - Has pistils that function, but stamens that

INFORMATION SHEET

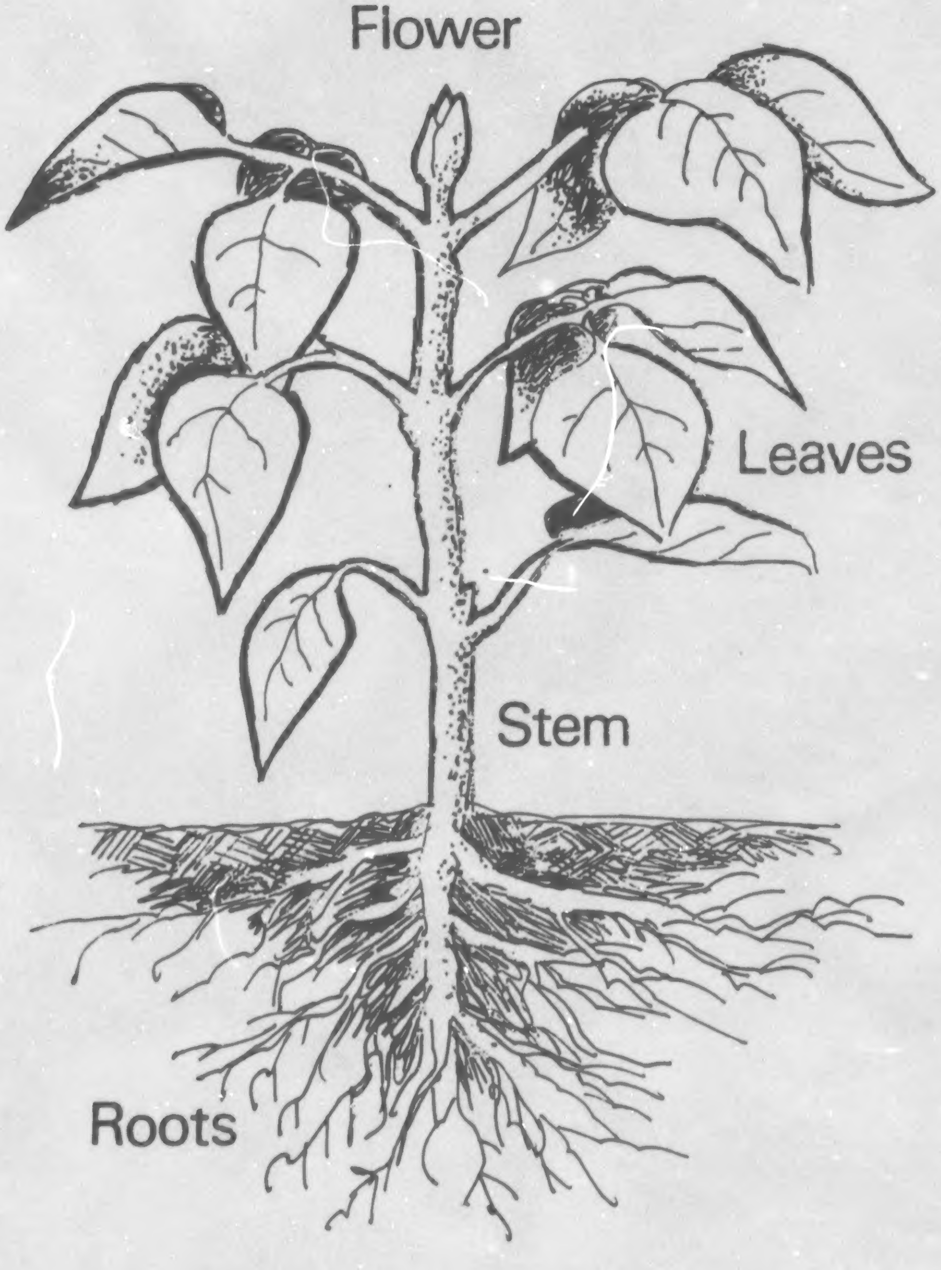
do not function.

XI. Types of Seedling Plants

A. Monocot - Plant that produces one seed leaf, such as palms, orchids, lilies, and grasses

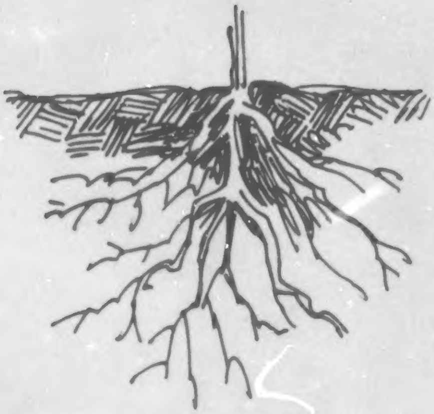
B. Dicot - Plant that produces tow seed leaves, such as most flowering plants, including deciduous trees, herbs, and shrubs

Parts of a Plant

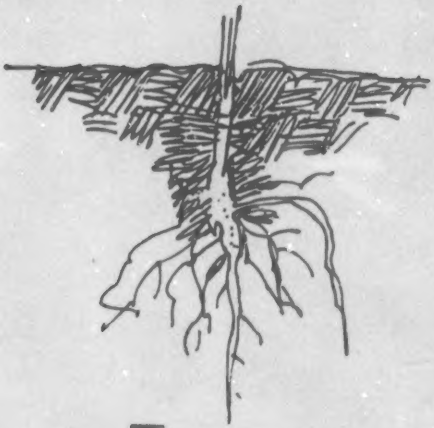

Flower
Leaves
Stem
Roots

TM 1

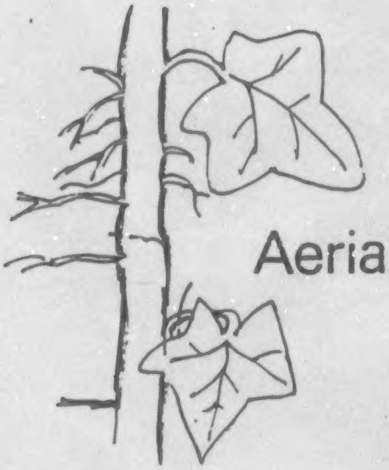
Types of Roots



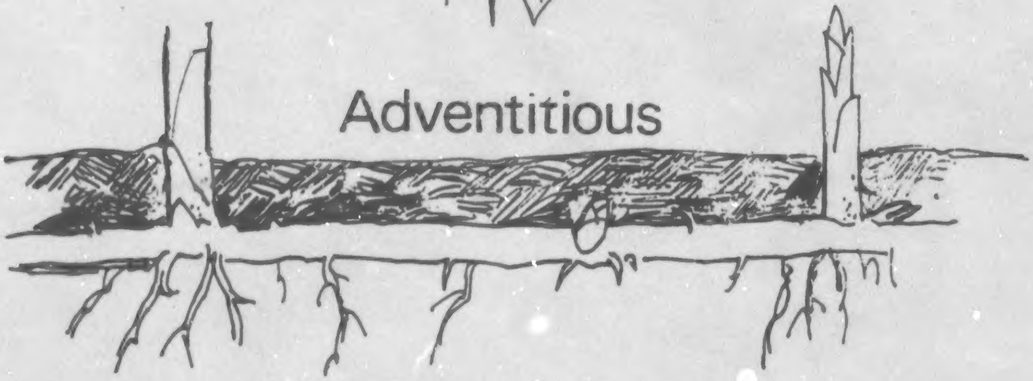
Fibrous



Taproot

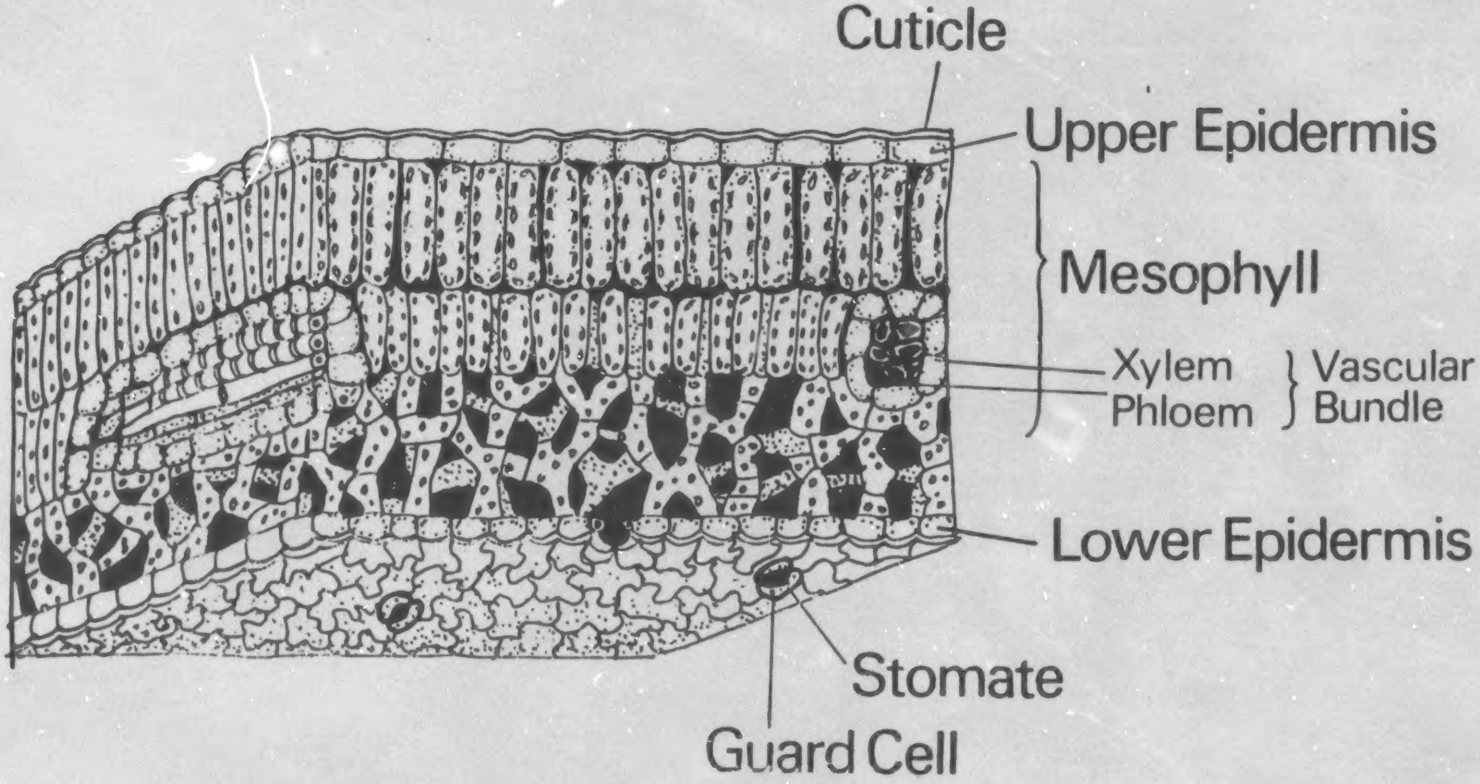


Aerial

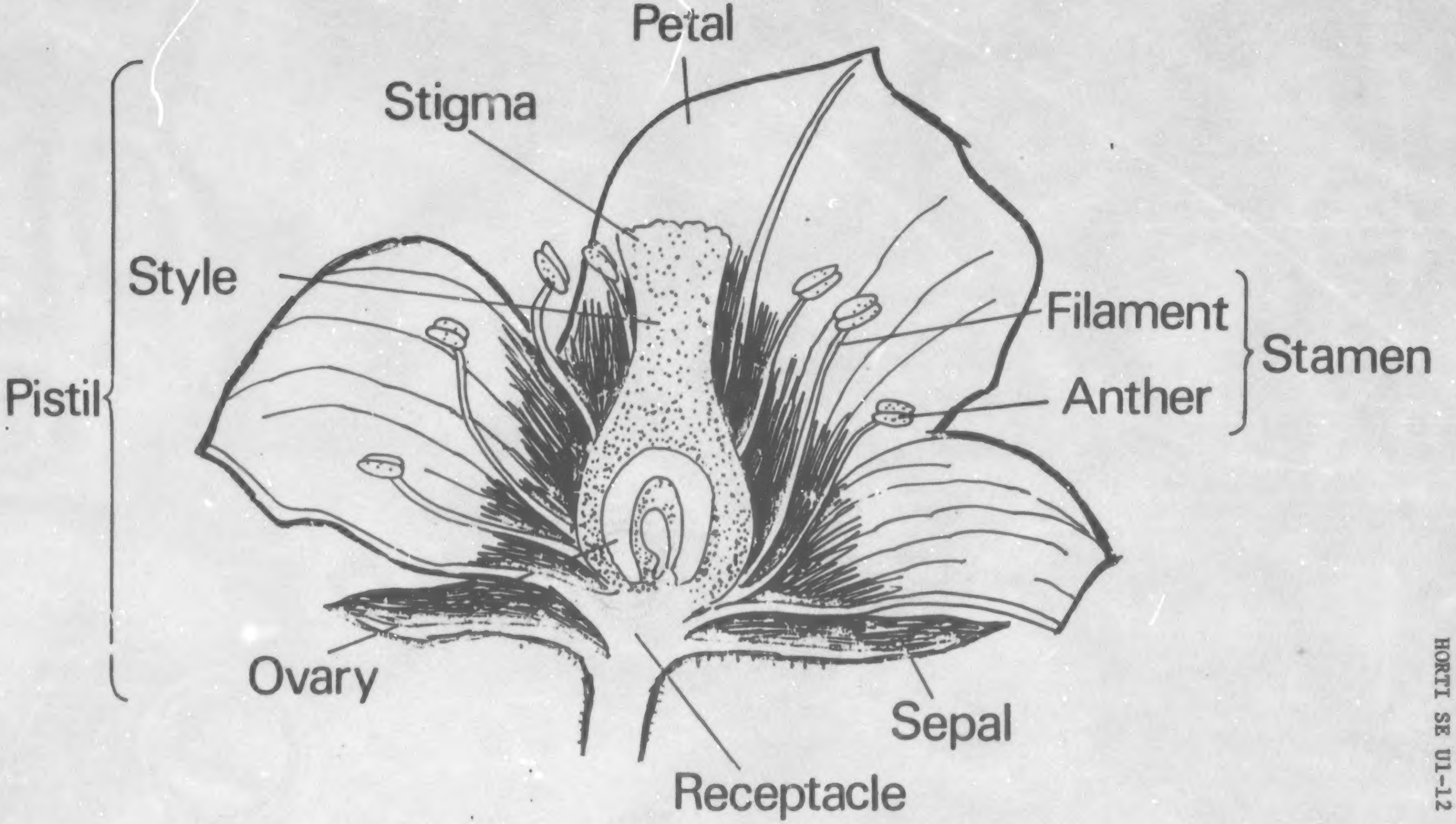


Adventitious

Leaf Parts


Cuticle
Upper Epidermis
Mesophyll
Xylem
Phloem
Vascular Bundle
Lower Epidermis
Stomate
Guard Cell

Flower Parts


Petal
Stigma
Style
Pistil
Filament
Stamen
Anther
Ovary
Sepal
Receptacle

PLANT GROWTH AND DEVELOPMENT

UNIT 1

ASSIGNMENT SHEET 1 : Fill In a Plant Part Table.

I. Fill In the Table Below with Basic Information From this Unit.

A. TABLE OF PLANT PARTS.

	PLANT PART NAMES	FUNCTIONS
ROOT		
STEM	**List Types of Above Ground Stems:**	
	List Types of Underground Stems	
	List Types of Above and Below Ground Stems:	
LEAF		
FLOWER		

PLANT GROWTH AND DEVELOPMENT
UNIT 1

ASSIGNMENT SHEET 2 : Plant Part Terms.

I. Fill in the terms found in this Unit that relate to these basic plant parts.

A. Root terms

1.
2.
3.
4.
5.
6.
7.

B. Stem terms

1.
2.
3.
4.
5.
6.
7.
8.

C. Leaf terms

1.
2.
3.
4.
5.
6.
7.
8.

D. Flower terms

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.
16.
17.

PLANT GROWTH AND DEVELOPMENT

UNIT 1

TEST

1. Match:

______a. Bract
______b. Chlorophyll
______c. Cambium
______d. Dicot
______e. Epidermis
______f. Phloem
______g. Photosynthesis
______h. Respiration
______i. Pistil
______j. Stamen
______k. Transpiration
______l. Xylem

1. Complex tissue that transports water and raw materials to manufacturing cells.
2. Complex tissue that trnasports food from the manufacturing cells.
3. A modified leaf that sometimes takes the place of petals.
4. Process by which plants form carbohydrates from interaction of CO_2, H_2O, sunlight, and chlorophyll.
5. Process of moisture loss through the leaves.
6. Process of taking in O_2 and giving off CO_2 and releasing energy for plant use.
7. The green vegetable pigment of plants essential to photosynthesis.
8. The male organ of a flower.
9. The female organ of a flower.
10. A layer on the surface of roots, stems and leaves.
11. The name of the plant tissue responsible for the growth of a plant in diameter.
12. A name for the kind of plant that produces two seed leaves.

2. Match:

______a. Root
______b. Stem
______c. Leaf
______d. Flower

1. Where transpiration takes place.
2. Contains organs specialized for sexual reproduction.
3. Site of raw and manufactured material conduction.
4. Absorbs water and minerals from soil.

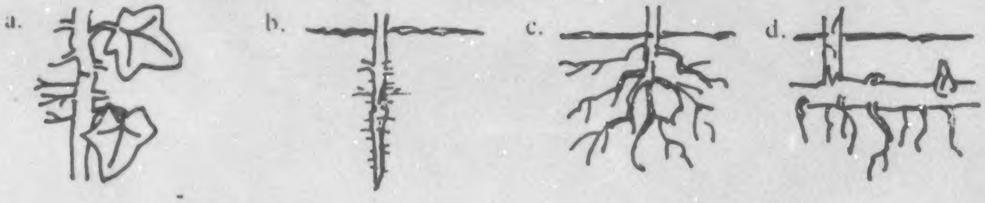
3. Match:

______a. Cambium
______b. Phloem
______c. Xylem

1. Transports manufactured foods.
2. Transports water and raw materials.
3. Responsible for growth in diameter.

TEST

4. Name the types of roots pictured.



5. State the function of root hairs.

6. a. Name five types of stems.
    b. Name two major functions of all stems

7. Match:

_____a. Epidermis
_____b. Mesophyll tissue
_____c. Veins

1. To keep water in the leaf, or to aid in spreading of CO_2 and O_2 through plant during photsynthesis and respiration.
2. Where initial food substances are manufactured.
3. To transport food from manufacturing cells, to conduct water and new materials to the manufacturing cells.

8. Match:

_____a. Scales
_____b. Bracts
_____c. Tendrils

1. Support plant.
2. Protect wood plants during winter.
3. Attract pollen bearers, or store nourishment for plant seed.

9. Match:

_____a. Sepals
_____b. Petals
_____c. Stamens
_____d. Pistils

1. Protect stamens and pistils in bud stage.
2. Produce ovules and catch and hold pollen.
3. Attract pollen bearers.
4. Produce pollen.

10. Select the correct words to make the following statements true:

"Apetalous, staminate, and pistillate flowers are also called (complete/incomplete) flowers because they (do/do not) have all four main parts of a flower."

TEST

11. Match:

______a. Grass

______b. Herbs

______c. Deciduous tree

______d. Orchid

1. Monocot plant
2. Dicot plant

PLANT GROWTH AND DEVELOPMENT

UNIT 2

PHOTOSYNTHESIS

TERMINAL OBJECTIVE

Upon completion of this unit, students will be able to differentiate between terms that pertain to photosynthesis; to state the photosynthesis process formula; to recognize the correct sequence of steps in photosynthesis; to name the principal inputs and products related to photosynthesis; to describe the effects of light, temperature, water, air, and rare gases on the photosynthesis process; and to demonstrate the formation of starch through photosynthesis utilizing given plants. This objective will be considered achieved upon successful performance of the job assigned, and by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, students will be able to:

1. Match terms pertaining to photosynthesis with their definitions.
2. State the photosynthesis formula using chemical symbols.
3. Designate the correct order of steps in the photosynthesis process, given a list of step descriptions that are not in order.
4. Name three inputs and three products of photosynthesis.
5. Label as true or false given statements concerning the effects of light upon the photosynthesis process.
6. State the optimum temperature range for photosynthesis.
7. State the word that denotes the most obvious effect of too much or too little water upon the photosynthesis process.
8. Select from given terms those that will make a given statement about the effect of aeration on photosynthesis a true statement.
9. Demonstrate with live leaves, given proper materials and instructions, the formation of starch through photosynthesis.

PLANT GROWTH AND DEVELOPMENT

UNIT 2

INFORMATION SHEET

I. Terms and Definitions

A. Photosynthesis - The process by which plants form carbohydrates from carbon dioxide (CO_2) and water (H_2O) through sunlight acting upon chlorophyll.

B. CO_2 - The chemical symbol for carbon dioxide

C. H_2O - The chemical symbol for water

D. O_2 - The chemical symbol for oxygen

E. Glucose - The name of a simple sugar (chemical symbol: $C_6H_{12}O_6$).

F. Chlorophyll - The green pigment in some plant cells essential in the process of photosynthesis.

G. Stomates - An opening in the epidermis of a leaf through which the gases CO_2 (carbon dioxide), which diffuses into the leaf; O_2 (oxygen), which diffuses out of the leaf; and H_2O (water vapor) enter and exit the plant.

H. Xylem - A complex tissue (wood) made of cells that transport water and essential raw materials that are in water.

I. Chloroplasts - Parts of cells that contain chlorophyll

J. Palisade Mesophyll - Area of leaf where chloroplasts are located and where photosynthesis takes place.

K. Phloem - A complex cellular tissue that transports manufactured compounds.

L. Vascular Bundle - A bundly of vessels in a plant where phloem and xylem are contained. Also lends regidity to the leaves and/or stem.

M. Transpiration - The giving off of water vapor through the stomates.

N. Aeration - Exposure to air to obtain oxygen, carbon dioxide, or both.

II. The Photosynthesis Formula

A. Meaning: photo = light; synthesis = putting together; therefore, photosynthesis = a putting together with light.

B. The formula:

$$6CO_2 \text{ (carbon dioxide)} + 12H_2O \text{ (water)} \xrightarrow[\text{sunlight}]{\text{chlorophyll}} C_6H_{12}O_6 \text{ (glucose)} + 6O_2 \text{ (oxygen)} + 6H_2O \text{ (water}$$

III. Basic Steps of the Photosynthesis Process in a Leaf (See TM 1)

A. Carbon dioxide (CO_2) enters the leaf through stomates.

B. Water (H_2O), which has been absorbed by root hairs and roots, enters the leaf through xylem.

C. Light strikes chloroplasts located in the palisade mesophyll section of the leaf, resulting in a production of energy.

D. This light energy enables a reaction to take place between H_2O and CO_2 that, in turn, forms glucose ($C_6H_{12}O_6$) and oxygen (O_2).

E. The glucose ($C_6H_{12}O_6$) is metabolized into many compounds that are carried by the phloem tubes to other parts of the leaf or plant, or are stored in roots.

F. Oxygen (O_2) exits or passes (diffuses) out of the leaf through the stomates (See TM 2).

IV. Inputs and Products of Photosynthesis in Plants

A. Inputs

1. Water (H_2O)
   a. From humidity (water vapor in air - very slight amount).
   b. From soil moisture (either natural or as a result of irrigation).
2. Carbon dioxide (CO_2)
   a. From atmosphere (air) through stomates.
3. Sunlight
   a. Supplies energy to bring together water (H_2O) and carbon dioxide (CO_2) to form a simple sugar (glucose).
   b. Intensity of light, quality of light, and duration of exposure to light are important to various types of plant life.
   c. Without enough light, most plants would be spindly and thin-stemmed. They would not mature, flower, and seed.

B. Products

1. Oxygen (O_2)
2. Plant growth
3. Glucose ($C_6H_{12}O_6$) - a simple sugar

V. Effects of Light Upon the Photosynthesis Process

A. Photosynthesis can proceed only in the presence of sunlight (or of artificial light from special lamps that supply the visible wavelengths of light): photosynthesis stops in darkness.

B. The photosynthesis process is increased if the leaf gets to be a darker green (the more chloroplasts there are in the palisade mesophyll, the darker green the color of the leaf will be).

C. The photosynthesis process slows down if light intensity is very low (low light intensity leads to a closing of the stomates).

D. The photosynthesis process slows down also if light intensity is very high (high light intensity destroys chlorophyll and other cells).

E. The optimum (i.e., best, neither too high nor too low) light intensity promotes the photosynthesis process

VI. Effects of Temperature upon the Photosynthesis Process

A. The optimum (i.e., best, most effective) temperature range for photosynthesis is to proceed is between $50^{o}F$ and $75^{o}F$.

B. Any increase in temperature will stimulate photosynthesis initially, but the optimum temperature range of between $50^{o}F$ and $75^{o}F$ is the range in which photosynthesis can best continue.

VII. Effects of Water upon the Photosynthesis Process

A. If there is little or no water in the soil

1. The plant wilts

2. Very little photosynthesis takes place

B. If there is too much water in the soil

1. Tops of plants wilt

2. Photosynthesis stops

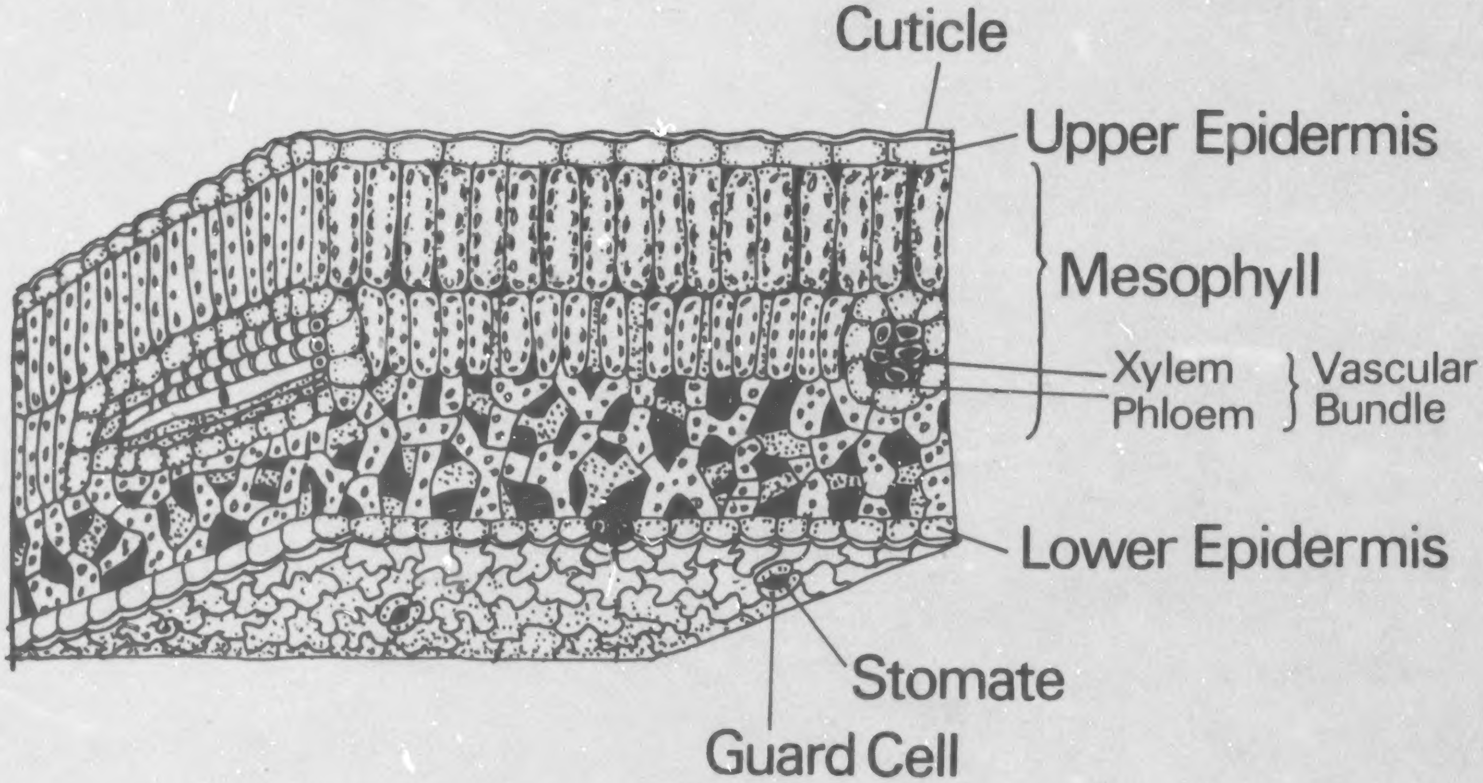
C. A plant once wilted will nevery carry on photosynthesis at as fast a rate as before it was wilted.

VIII. Effects of Aeration Upon the Photosynthesis Process (See TM 3)

A. Above-ground (or atmospheric) aeration - CO_2 content of air is normally .03%. and photosynthesis occurs optimally with that percentage.

B. Below-ground (or soil) aeration - Atmosphere in soil must contain same proportions of CO_2 and O_2 as above-ground atmosphere for photosynthesis to proceed optimally.

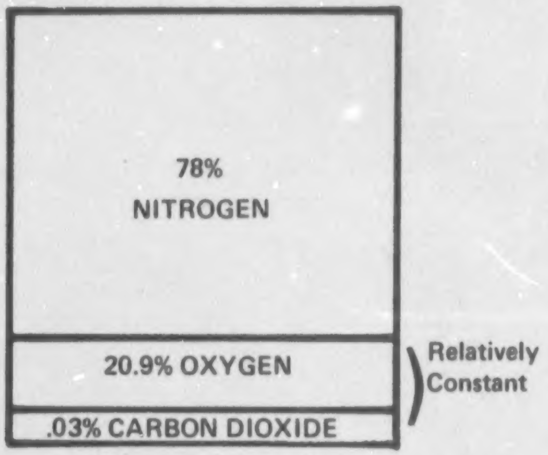
Section of a Leaf


Cuticle
Upper Epidermis
Mesophyll
Xylem
Phloem
Vascular Bundle
Lower Epidermis
Stomate
Guard Cell

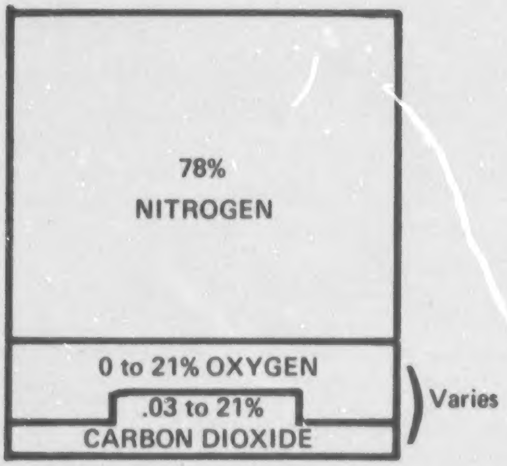
TM 1

Basic Gas Composition

Air in Soil and Atmosphere

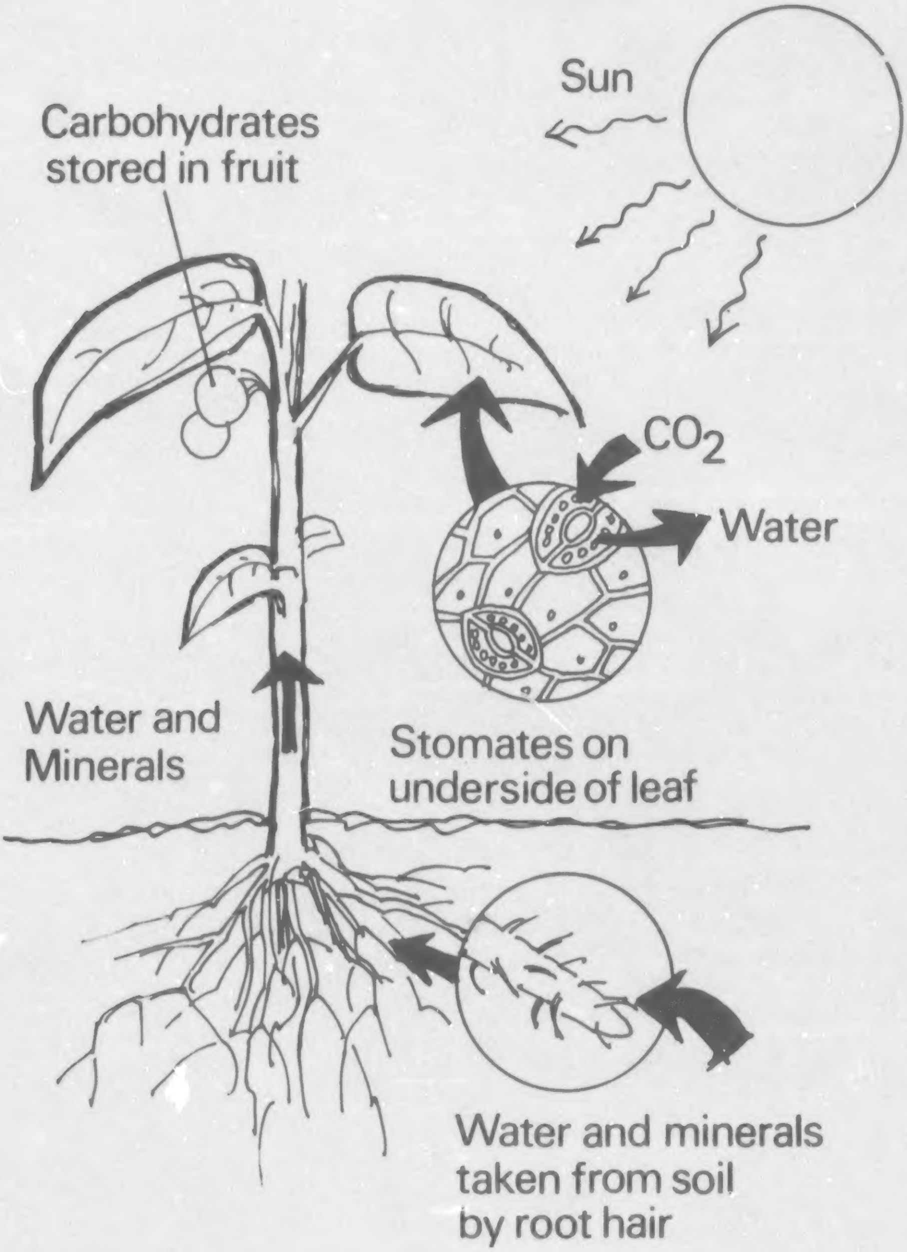

78%
NITROGEN
20.9% OXYGEN
.03% CARBON DIOXIDE
Relatively Constant

ATMOSPHERIC AIR


78%
NITROGEN
0 to 21% OXYGEN
.03 to 21%
CARBON DIOXIDE
Varies

SOIL AIR

Photosynthesis


Sun
Carbohydrates stored in fruit
CO_2
Water
Water and Minerals
Stomates on underside of leaf
Water and minerals taken from soil by root hair

TM 2

JOB SHEET 1 : Effects of Light on Photosynthesis.

I. Materials Needed:

A. Any plant that has a large leaf (green), such as geranium, coleus or philodendron.

B. Six corks (the corks may be sliced into ¼ inch pieces and the pieces used in place of the whole corks).

C. 3 straight pins.

II. Procedure:

A. Select one of the above plants and place one cork on the top of a large green leaf.

B. Place another cork directly beneath the top cork on the underside of the leaf.

C. Insert a straight pin through both corks and the leaf. This will eliminate light from that area of the leaf.

D. Repeat the above procedures on two other leaves of the plant.

E. Remove one pair of corks at the end of 24 hours, another at 48 hours.

F. After removal of the corks, observe the plants for three days.

III. What Have You Learned?

A. At the time the corks are removed, describe the color of the spots under the corks removed at the end of:

1. 24 hours: ______________________________

2. 48 hours: ______________________________

3. 72 hours: ______________________________

B. After three days, did spots on any of the plants turn green? ________

If so, which ones? ______________________________

If not, why not? ______________________________

PLANT GROWTH AND DEVELOPMENT

UNIT 2

TEST

1. Match:

______a. Photosynthesis
______b. CO_2
______c. H_2O
______d. O_2
______e. Glucose
______f. Chlorophyll
______g. Stomates
______h. Xylem
______i. Chloroplasts
______j. Palisade Mesophyll
______k. Phloem
______l. Vascular bundle
______m. Transpiration
______n. Aeration

1. The giving off of water vapor.
2. Exposure to air.
3. A complex tissue that transports water and raw materials.
4. A complex tissue that transports manufactured compounds.
5. The chemical symbol for carbon dioxide.
6. The chemical symbol for oxygen.
7. The chemical symbol for water.
8. Cells that contain chlorophyll
9. The name of a simple sugar.
10. The green vegetable pigment in plants, essential to photosynthesis.
11. Opening in the epidermis through which gases enter and exit a plant.
12. The process by which plants form carbohydrates from CO_2 and H_2O through sunlight acting upon chlorophyll.
13. Area of leaf where chloroplasts are located.
14. Vessels in a plant where phloem and xylem are contained.

2. State the photosynthesis formula in chemical symbols.

3. Indicate the correct sequence of steps in photosynthesis by placing numerals 1, 2, 3, 4, 5, and 6 in appropriate blank.

_____a. CO_2 enters leaf (diffuses into).
_____b. O_2 exits (diffuses out of).
_____c. Glucose is carried to other parts of plant, or is stored in roots.
_____d. Sunlight strikes chloroplasts, and energy is absorbed.
_____e. H_2O enters leaf.
_____f. A reaction takes place between H_2O and CO_2, producing glucose and oxygen.

TEST

4. a. Name three inputs to photosynthesis.
   b. Name two products of photosynthesis.

5. Indicate which of the following statements are true, which are false.

   ______a. Photosynthesis can proceed only in sunlight (or special artificial light).

   ______b. The darker green the leaf, the slower the photosynthesis.

   ______c. Photosynthesis slows down if light intensity is very low or very high.

   ______d. The total photosynthesis process can proceed in darkness.

6. State the optimum temperature range for photosynthesis to proceed.

7. State one word that describes what happens when a plant gets too much or too little water: The plant __________________.

8. Select the term from those in parentheses that makes the following a true statement.

   "The (CO_2/O_2/H_2O/$C_6H_{12}C_6$) content of air should be (.03%/0.1%/0.2%) for photosynthesis to occur optimally."

9. Perform job in Job Sheet 1 to the satisfaction of the instructor.

PLANT GROWTH AND DEVELOPMENT

UNIT 3

RESPIRATION

TERMINAL OBJECTIVE

Upon completion of this unit, students will be able to match terms that relate to respiration; state formula for respiration; and name factors affecting respiration and state characteristics of these factors. Students will also be able to construct and record a live demonstration of the utilization of oxygen in respiration. This objective will be considered achieved upon successful performance of the job assigned, and by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, students will be able to:

1. Match definitions with terms that relate to respiration.
2. State the chemical formula for respiration utilizing chemical notation.
3. Name two primary factors affecting respiration.
4. Restate accurately at least three characteristics of the primary factors affecting respiration.
5. Identify as true or false given statements concerning factors that affect the rate of respiration.
6. Name at least two functions of water that indicate the necessity of water in the respiration process.
7. Choose from given terms those that will make a true statement about respiration as a basic life process.
8. Construct from given materials a demonstration of the utilization of oxygen in respiration, and record data in a given table.

PLANT GROWTH AND DEVELOPMENT

UNIT 3

INFORMATION SHEET

I. Terms and Definitions.

A. Respiration - The controlled breaking down or burning of glucose manufactured through photosynthesis to produce energy for plant processes.

B. $C_6H_{12}O_6$ - The chemical notation for glucose (sugar).

C. O_2 - The chemical notation for Oxygen.

D. CO_2 - The chemical notation for Carbon Dioxide.

E. Photosynthesis - The process by which plants form carbohydrates from Carbon Dioxide (CO_2) and Water (H_2O) through the agency of sunlight acting on chlorophyll.

F. Nutrient - Something that nourishes.

II. The Chemical Formula for Respiration.

A. The chemical formula for Respiration is:

$$\text{Glucose}\,(C_6H_{12}O_6) + \text{Oxygen}\,(O_2) \text{-----} \text{Carbon Dioxide}\,(CO_2) + \text{Water}\,(H_2O) + \text{Energy}$$

(NOTE: The formula for respiration is the reverse of the formula for Photosynthesis. See TM 1 of this Unit.)

III. Primary Factors Affecting Respiration.

A. Temperature

B. Available food supply

C. Light

IV. Some Characteristics of the Primary Factors Affecting Respiration.

A. High temperature increases the rate of respiration and depletes food supply faster.

B. If temperature is in the range of from 40°F to 97°F, every increase of 18°F will double the rate of respiration.

C. Respiration occurs both day and night, while photosynthesis occurs only with certain kinds of light. Thus, respiration must be slowed at night (by reducing temperature) to compensate for the fact that food is not manufactured in the dark.

D. Relatively, temperature should be kept lower during overcast days to balance the relationship between respiration and slower photosynthesis.

INFORMATION SHEET

E. Low temperatures ($31^\circ F$ to $34^\circ F$, i.e., near the freezing point) slow down respiration enough so that some plants may be stored for prolonged periods:

1. Example: Unrooted carnation cuttings - up to 1 year.
2. Example: Rooted carnations cuttings - 3-4 weeks.
3. Example: Unrooted chrysanthemum cuttings - about 2 weeks.
4. Example: Rooted chrysanthemum cuttings - 3-5 days.

F. Respiration rate cannot exceed photosynthesis rate because respiration depends upon food supply.

1. Some normal plants in balanced growth dan store some of the food they produce. For example, roots (carrots),tubers (potatoes), fruit (apples), stems (asparagus).

V. Factors That Affect the Rate of Respiration.

A. Rate of tissue growth (The faster the rate of tissue growth, the faster the rate of respiration).

B. Temperature (The higher the temperature, the faster the rate of respiration).

C. Availability of O_2 and $C_6H_{12}O_6$ (glucose) (The more O_2 the faster the rate of respiration).

D. Age and condition of cells and tissues. (The younger and healthier the cells the faster the rate of respiration).

VI. The Necessity of Water to Respiration.

A. Water provides nutrients to plants.

1. Hydrogen
2. Oxygen

B. Water acts as a transporting medium for nutrients and food within the palnt.

C. Water serves as a medium for the absorption of nutrients into plants.

VII. Why Respiration is a Basic Life Process.

A. Both plants and animals give off CO_2 in respiration.

B. Without a certain amount of CO_2 in the air, plants and animals would die.

C. Therefore, the giving off of CO_2 in the respiration process insures that air will continue to contain CO_2.

SOME DIFFERENCES:

Photosynthesis & Respiration

PHOTOSYNTHESIS	RESPIRATION
$6CO_2 + 6H_2O + \text{Energy} \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 6H_2O$	$C_6H_{12}O + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{Energy}$
ORGANIC MATTER IS CONSTRUCTED	ORGANIC MATTER IS TRANSFORMED
H_2O AND CO_2 ARE RAW MATERIALS	H_2O AND CO_2 ARE BY-PRODUCTS
OXYGEN IS LIBERATED (GIVEN OFF)	OXYGEN IS ABSORBED (USED)
ENERGY IS STORED	ENERGY IS RELEASED (GROWTH AND HEAT)
OCCURS ONLY IN GREEN CELLS	OCCURS IN ALL LIVING CELLS
OCCURS ONLY IN DAYTIME (LIGHT)	OCCURS ALL TIMES

JOB SHEET 1 : Utilization of Oxygen in Respiration

(NOTE: The respiration formula shows that oxygen is used by all plants during respiration. This exercise should make this obvious.)

I. Equipment and Materials Needed.

A. 10 bean or pea seeds (previously soaked in water for two days. Change water each day, then wrap the soaked seeds in paper toweling, place in a plastic bag, and leave in room temperature for two more days.)

B. Alkali solution (dissolve one tablespoon household lye in ¼ cup of water.)

CAUTION: This solution is dangerous! Wash off immediately if you should get some on your hands. A vinegar solution is best, but plenty of water in any case. WEAR SAFETY GLASSES!

C. One-2 oz. medicine bottle with a rubber stopper (with a hole in it)

D. Three pipe cleaners

E. Glass tube

F. Millimeter ruler

II. Procedure.

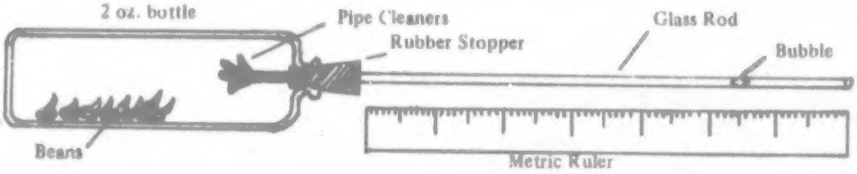
A. Place the 10 germinating seeds loose in the medicine bottle.

B. Fix the pipe cleaners on the stopper as shown in the picture below and dip the ends of them into the alkali solution.

C. Insert the glass tube into the rubber stopper and insert the stopper into the bottle.

D. Place a drop of colored water at the end of the glass tube.

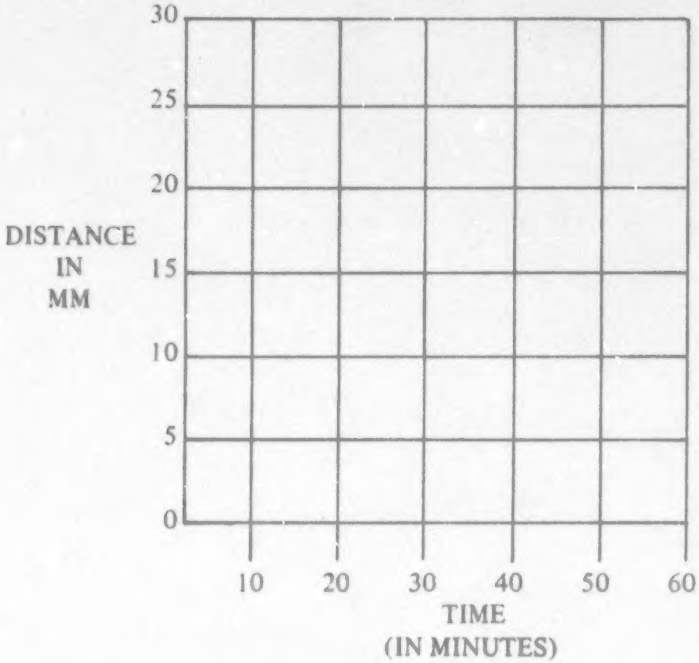
E. Carefully lay the ruler alongside the glass tube so you can read the distance on the ruler as the bubble moves.



F. As soon as you place the drop of colored water at the end of the glass tube, this begins "0" time.

G. Measure the distance the bubble moves at the end of 10, 20, 30, 40, 50 and 60 minutes.

H. Record the data on the graph below, making points on the graph, and then connect the points to show a curve.



RESPIRATION

UNIT 3

TEST

1. Match:

______a. Respiration

______b. $C_6H_{12}O_6$

______c. O_2

______d. CO_2

______e. Photosynthesis

______f. Nutrient

1. The process by which plants form carbohydrates from CO_2 and H_2O through the agency of sunlight acting on chlorophyll.
2. The controlled breaking down or burning of plant-manufactured glucose to produce energy for plant processes.
3. Something that nourishes.
4. The chemical notation for oxygen.
5. The chemical notation for glucose.
6. The chemical notation for carbon dioxide.

2. State the chemical formula for respiration utilizing chemical notations.

3. Name two primary factors affecting respiration.

4. Restate accurately at least three charactersitics of the primary factors affecting respiration.

5. Identify as True or False each of the following statements concerning factors that affect the rate of respiration:

______a. The less oxygen and glucose available, the faster the rate of respiration will be.

______b. The older and sicklier the cells and tissues of a plant, the faster the rate of respiration will be.

______c. The slower the rate of tissue growth in a plant, the slower the rate of respiration will be.

______d. The higher the temperature surrounding a plant, the faster the rate of respiration will be.

6. Name at least two functions of water that indicate the necessity of water in the respiration process.

7. Choose the terms that will make the following statement about respiration as a basic life process a true statement:

"The giving off of ($O_2/C_6H_{12}O_6/CO_2$) in the respiration process insures that the atmosphere will continue to contain it, and that therefore plants and animals will (live/die)."

TEST

8. Perform job in Job Sheet 1 to the satisfaction of the instructor.

PLANT GROWTH AND DEVELOPMENT

UNIT 4

WATER ABSORPTION, TRANSLOCATION, AND TRANSPIRATION

TERMINAL OBJECTIVE

Upon completion of this unit, students will be able to match terms pertaining to water absorption, translocation, and transpiration and with the process of water movement in plants. Students will be able to name the two mechanisms by which water absorption takes place, and demonstrate the Cohesion Theory. Students will also be able to demonstrate the processes of translocation and transpiration, including the effects of various environmental changes, and the effect of transpiration on plants. This objective will be considered achieved upon successful completion of the jobs assigned and by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, students will be able to:

1. Match terms pertaining to water absorption, translocation, and transpiration to their definitions.
2. Insert the words transpiration, absorption, translocation, and osmosis in the proper blanks in a sentence about the movement of water in plants so that the sentence becomes a true one.
3. Name two mechanisms by which water absorption takes place, indicating which of the two accounts for the more water absorption in plants.
4. Select which of given statements about passive absorption are true and which are false.
5. Select which of given statements about active absorption are true and which are false.
6. Select which of given statements about transpiration are true and which are false.
7. Answer correctly three sequential questions concerning the transpiration process.
8. Identify given statements of environmental changes as to which bring about an increase and which bring about a decrease in transpiration.
9. Select which of given statements about the effects of transpiration are true and which are false.
10. Demonstrate the operation of the Cohesion Theory, given suitable materials.
11. Conduct an experiment showing the effect of wind on transpiration, given appropriate instructions and materials.

PLANT GROWTH AND DEVELOPMENT

UNIT 4

INFORMATION SHEET

I. Terms and Definitions.

A. Absorption - The entering and spreading of minerals and water into and through a plant.

B. Translocation - The movement or conduction of water soluble organic materials and minerals from one part of the plant to another part.

C. Transpiration - The giving off or losing of water vapor from a plant.

D. Active Absorption - Absorption accomplished by action within the plant itself.

E. Passive Absorption - Absorption accomplished by action of forces outside the plant (Such as pressure).

F. Cohesion - The sticking or holding together as parts of the same mass or substance. In horticulture, the sticking or holding together of water molecules.

G. Molecule - The smallest particle into which a substance can be divided without a chemical change. For example, one molecule of water is H_2O: any further breakdown or division would cause a chemical change into H or O.

H. Osmosis - The process by which a liquid passes through cell membranes (in this unit, the liquid considered is water).

I. Semipermeable Membrane - A membrane that has no obvious opening but through which liquids and certain dissolved minerals can move and become mixed. See Osmosis above.

II. Water Movement in Plants.

A. Water enters plants by absorption.

B. Water moves upward, downward, and horizontally from plant part to plant part by translocation.

C. Water exits from plants by transpiration.

D. Most absorption and translocation of water occurs by osmosis through semipermeable cell membranes.

III. Water Absorption.

A. Water is absorbed into plants by two mechanisms.

1. Passive Absorption (accounts for 95%-98% of water absorption)
2. Active Absorption (accounts for 2%-5% of water absorption)

B. Too much or too little soil water can result in plants not receiving proper amount of oxygen, which in turn will kill root hairs and prevent absorption.

IV. How Passive Absorption Works.

A. The pressure of water in the soil pushes it into roots and through

INFORMATION SHEET

xylem tubes by osmosis as water is lost by transpiration (when transpiration causes water loss it also causes reduced pressure thus making the normal pressure of soil water stronger than the pressure of the water in the plant).

B. Since water loss through transpiration is constantly taking place (more or less rapidly depending upon the relative humidity of the air around the plant), there is almost always less water pressure in the plant and more water pressure in the soil. This is why passive absorption accounts for most (95%-98%) of the water absorption that takes place in plants.

C. Passive absorption is much more rapid than active absorption because of the action of outside pressure.

V. How Active Absorption Works.

A. Water can move into and within plants without outside pressure, too, and when it does, such movement is called active absorption.

B. In active absorption, water moves according to what is called "The Cohesion Theory."

1. According to the Cohesion Theory water adheres to cell walls. Each water molecule coheres to the one next to it. The molecules "pile up" cohesively forming a column of water that moves from where it is in high concentration to where the concentration of water is relatively low.

2. Thus, water moves from where most water enters (roots) up the plant (through xylem tubes) to where water is relatively lacking.

(NOTE: A theory of the process of active absorption called the "Capillary Action Theory" is referred to in come books. It is no longer the accepted theory, and is not discussed in this Manual.)

VI. Translocation

A. Once water is in the plant it, and the raw material it carries, move to the various plant parts, go through the photosynthesis process and nourish the plant.

B. Xylem and Phloem tissues are the principal means of transport.

C. Direction of movement may be up, down, or horizontal (e.g., fertilizer applied to leaves can be absorbed and translocated downward).

D. If quality of water is such that water is deficient in minerals and other nutrients, the photosynthesis process will be less effective and the plant's growth will be retarded.

VII. The Transpiration Process.

A. Water exits from plants through open stomates in leaves.

1. As water exits, the amount of water in the leaf cells is lessened.

2. The water in the cells that adjoin these cells that are short of

water moves into them to replace what water was lost (water moves from area of highest concentration to area of lower concentration; see Cohesion Theory above).

VIII. Environmental Conditions That Influence Transpiration.

A. Light - Transpiration (water loss) is generally reduces at night, because stomates (through which water exits) are generally closed at night.

B. Temperature - Transpiration is increased as temperature increases, because higher temperature increases evaporation of water lost through transpiration, thus decreasing water pressure in plant, increasing passive absorption, and moving water through plant faster, and increasing water loss.

C. Availability of Water - Transpiration is increased as the availability of water is increased, and it is reduced as availability of water is reduced. Water deficiency causes plants to wilt. If a plant is wilted for too long a time it will die.

D. Humidity - Transpiration will continue to occur even in high relative humidity, because the water pressure and temperature within the leaf is higher than outside. In general, the lower the relative humidity, the higher the transpiration rate.

(NOTE: Plant growers can often improve the quality of plants by keeping relative humidity high during daylight hours. In this way, they reduce the transpiration (water loss) and enable cells of plants to grow larger and stronger.

E. Wind - Transpiration is increased as air movement around a leaf increases in speed, because air movement (wind) dissipates moisture accumulated on and around the leaf.

IX. Some Effects of Transpiration

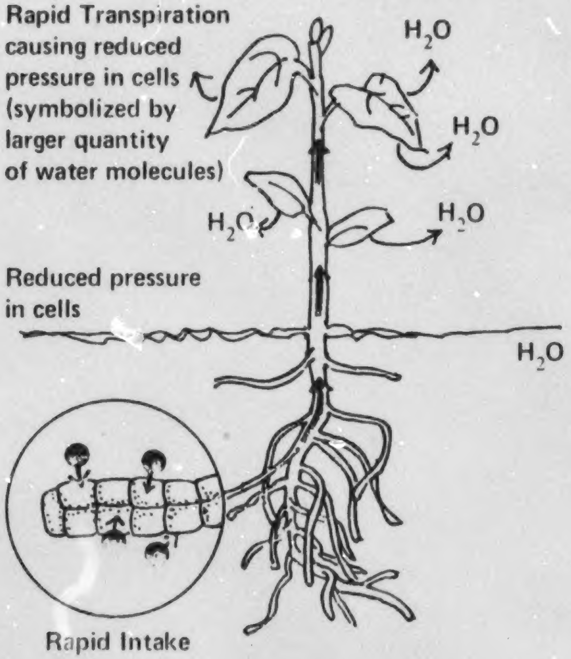
A. Transpiration enables the plant to take in CO_2 (necessary to photosynthesis) as well as give off water vapor, because as stomates open to give off water, CO_2 can enter through them.

B. Too rapid transpiration (as in hot, dry, and/or windy environment) can cause plant to lose more water than roots can take in.

Passive and Active Absorption

Relative Difference in Water Movement

PASSIVE ABSORPTION

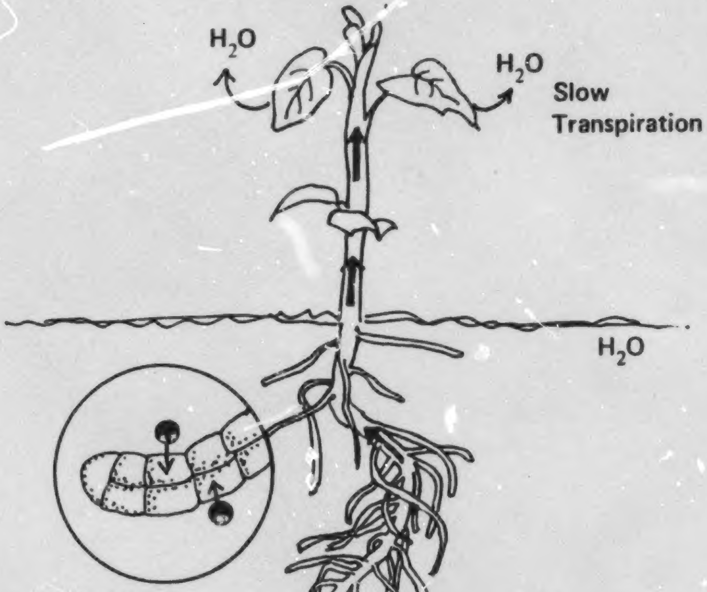


Rapid Transpiration causing reduced pressure in cells (symbolized by larger quantity of water molecules)

Reduced pressure in cells

Rapid Intake

ACTIVE ABSORPTION



Slow Transpiration

Lower Water Concentration Inside Cell

ASSUME IN BOTH CASES:

A. Normal Pressure in Atmosphere

B. Adequate Soil Moisture

PLANT GROWTH AND DEVELOPMENT

UNIT 4

JOB SHEET #1: Demonstrate the Cohesion Theory

I. Materials Needed:

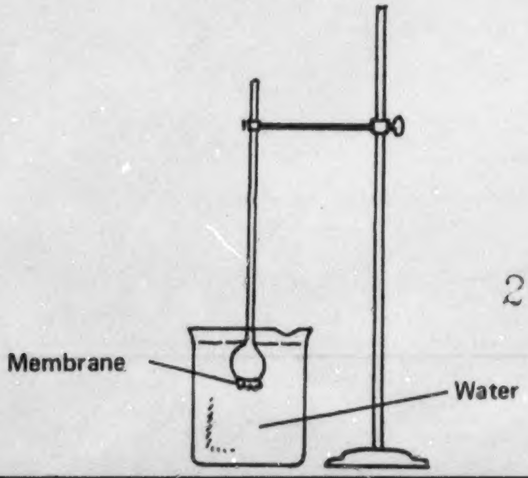
- A. Thistle tube
- B. Semipermeable membrane
- C. Sugar
- D. String or rubber band
- E. Beaker containing water
- F. Ring stand

II. Procedure:

- A. Dissolve some sugar in about ½ cup of water.
- B. Stop up the tube end of the thistle tube and pour enough of the sugar into the tube to where the build is about ½ full.
- C. Securely tie the membrane on the bulb end of the thistle tube.
- D. Invert the bulb end in the beaker of water and hold in place with ring stand.
- E. Place a mark on the outside of the tube at the sugar water level.
- F. Place a new mark on the tube at the end of 5, 10, 20, and 30 minutes.

III. What Have You Learned?

- A. Where was the water more highly concentrated at the beginning of the demonstration?
- B. What effect on the volume of liquid in the tube did the addition of sugar make?
- C. Was the volume of liquid the same as the volume of water in the tube? Why, or why not?



PLANT GROWTH AND DEVELOPMENT

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UNIT 4

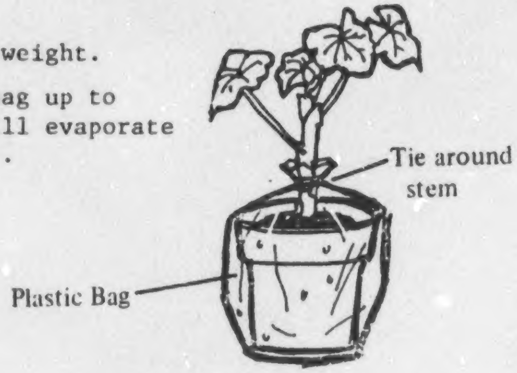
JOB SHEET #2: The Effect of Wind on Transpiration

I. Equipment and Materials Needed:

1. Two geranium plants in pots.
2. Scales
3. Two plastic bags
4. Electric fan

II. Procedure.

1. Weigh each plant and record the weight.
2. Cover both pots with a plastic bag up to the stem so none of the water will evaporate from the soil (see illustration).



3. Leave one of the plants under normal conditions.
4. Place the other plant in front of the breeze from a fan. Make sure the fan does not bother the plant.
5. For three days weigh each plant and record the weight.
6. Calculate the amount of water lost through transpiration for each plant. Also calculate the percentage of water through transpiration for each plant.

	INITIAL WEIGHT	1ST DAY WEIGHT	DIFFERENCE	3RD DAY WEIGHT	DIFFERENCE	TOTAL % DIFFERENCE
PLANT 1						
PLANT 2						

III. What Have You Learned?

A. Which plant lost the most water by evaporation? Why?

B. Where did the water that was lost come from?

C. Why did the plant that lost the least water retain what it did?

D. Consider a field of wheat on a windy hot day. Let's say 10,000 gallons of water are needed to produce a bushel of wheat. But on such a day, 99% of the water is lost through evaporation and transpiration. How many gallons are actually used to produce this bushel of wheat? Are all 10,000 gallons needed?

PLANT GROWTH AND DEVELOPMENT

UNIT 4

TEST

1. Match the terms on the right with the correct definition.

_____a. The sticking or holding together as parts of the same mass or substance, the sticking or holding together of water molecules

_____b. The giving off or losing of water vapor from a plant

_____c. The process by which liquid passes through cell membrane

_____d. Absorption accomplished by within the plant itself

_____e. The smallest particle into which a substance can be divided without a chemical change

_____f. Absorption accomplished by action of forces outside the plant

_____g. The entering and spreading of minerals and water into and through a plant

1. Transpiration
2. Absorption
3. Passive absorption
4. Molecule
5. Active absorption
6. Osmosis
7. Cohesion

2. Insert the correct word to complete the sentence.

A. Water enters plants by _______________________.

B. Water moves upward, downward, and horizontally from plant part to plant part by _______________________.

C. Water exits from plants by _______________________.

D. Most absorption and translocation of water occurs by _______________ through semipermeable cell membranes.

3. Name two mechanisms by which water is absorbed into plants.

a.

b.

4. Identify as true or false the following statements about how passive absorption works.

_____ a. The pressure of water in the soil pushes it into roots and through xylem tubes by osmosis as water is lost by transpiration

_____ b. Passive absorption is much less rapid than active absorption because of the action of outside pressure

_____ c. Since water loss through transpiration is constantly taking place, there is almost always less water pressure in the plant and more water pressure in the soil

_____ d. Passive abosorption accounts for most (95%-98%) of the water absorption that takes place in plants.

5. Identify as true or false the following statements about how active absorption works.

_____ a. When water moves into and within plants with outside pressure such movement is called active absorption.

_____ b. In active absorption, water moves according to what is called "The Cohesion Theory"

_____ c. According to the Cohesion Theory water adheres to cell walls.

_____ d. According to the Cohesion Theory water moves from where most water enters (roots) up the plant to where water is relatively lacking.

6. Identify as true or false the following statements concerning the translocation process.

_____ a. Once water is in the plant it, and the raw material it carries, move to the various plant parts, go through the photosynthesis process and nourish the plant.

_____ b. Phloem tissues are the only means of transport in the plant.

_____ c. Direction of movement of liquid in the plant may be up, down, or horizontal.

_____ d. If the water is deficient in minerals and other nutrients, the photosynthesis process will be more effective and the plant will have accelerated growth.

7. Answer the following questions concerning the transpiration process.

   a. How does water exit from plants?

   b. As water exits from the plant what happens to the amount of water in the leaf cells?

   c. What happens to the water in the plant when cells lose water?

8. Identify which statements bring about an increase (I) and which bring about a decrease (D) in transpiration.

   _____1. Lack of light

   _____2. Increase in temperature

   _____3. Increase in the amount of water available to plant

   _____4. High relative humidity

   _____5. Air movement and wind

9. Identify as true or false the following statements concerning the effects of transpiration.

   _____a. Transpiration enables the plant to take in CO_2 as well as give off water vapor.

   _____b. A hot, dry, and/or windy environment can cause a plant to lose more water than roots can take in.

NURSERY OPERATIONS

UNIT 1

KINDS OF NURSERIES

TERMINAL OBJECTIVE

Upon completion of this unit, students will be able to describe the kinds of nurseries; the importance of the nursery industry; to list the factors considered in the selection of a nursery site; and to list the facilities and equipment necessary for the production of nursery plants. This objective will be considered achieved by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, students will be able to:

1. Match terms pertaining to the nursery productions and industry and the historical development of the nursery industry.

2. Name the facilities and equipment necessary for the production of nursery plants.

3. State the different types of businesses within the two major categories of the nursery industry.

4. State factors to consider in the selection of a nursery site.

NURSERY OPERATIONS

UNIT 1

INFORMATION SHEET

I. Terms and Definitions:

A. Annuals - plants that complete the life cycle, from seed to seed, in one season

B. Biennial - plants that require exposure to the winter season before they can flower, require two growing seasons to flower

C. Consumer - a person who consumes ("uses up") a product

D. Cultivar - a population of identical plants (the same thing as "variety")

E. Cutting - a part of a plant, usually a stem or root piece, that is induced to produce roots and to grow into a new individual plant

F. Deciduous trees - trees whose leaves fall off in autumn

G. Evergreen trees - trees with leaves that are green throughout the year

H. Greenhouse - a transparent structure in which plants may be propagated and grown under controlled temperature, moisture, nutrition, and light conditions

I. Heeling in - temporarily placing newly dug stock in a trench, with roots covered with moist soil, peat, or shingletow

J. Herbicide - a chemical for destroying undesirable plants, both grasses and broadleaf plants

K. Insecticide - a chemical for destroying harmful insects

L. Liner - a small plant of suitable size for planting in rows (lines) in a nursery

M. Nursery - a business firm that propagates, grows, and sells trees, shrubs, vines, and flowering plants; it may engage in any one or all of these activities

N. Perennial - a plant that lives for several to many years

O. Retailer - a merchant who sells goods in small quantities direct to the consumer

P. Seedling - a small plant grown from a seed

Q. Stock - saleable products; in a nursery, "stock" refers to plant material

R. Transplant - a young plant of suitable size for planting in a permanent position (about 2 to 4 inches tall)

S. Wholesaler - one who sells stock in large quantities to the retailer

INFORMATION SHEET

II. Kinds of Nurseries

A. The nursery business, as defined by the American Association of Nurserymen, refers to the production and/or distribution of plant materials, including trees, shrubs, vines, and other plants having a persistent woody stem or stems, and all herbaceous annuals, biennials, or perennials generally used for outdoor planting, by those companies whose major activities are agricultural or horticultural. It includes such business activities as the planting and sowing of landscaped areas.

B. Wholesale Grower Nurseries - The function of the wholesale nursery is to grow nursery plants to marketable size and to sell them in large lots to retail outlets through its own salesmen or through agents, brokers, or wholesalers.

C. Wholesale Grower Specialists - limit their production to a particular kind of plant, or a particular group of plants. There is a trend toward increasing numbers of this kind of nursery. Some nurseries produce only roses; others, only broadleaf evergreens, or ground covers, plants, or shade trees.

D. The Landscape Nursery - sells and plants landscape jobs. It may design landscape plans or follow plans made by a landscape designer or landscape architect.

E. A Landscape Contractor - is a specialized kind of landscape firm. It does not prepare landscape plans, but executes the plans designed by a professional landscape architect or designer.

F. Garden Stores or Garden Centers - are important in nursery retailing. Garden stores sell nursery plants, seeds, bulbs, roses, vegetable and flower transplants, fertilizer, mulching materials, pest control materials, tools, equipment, outdoor furniture, and outdoor ornaments.

G. Mail Order Nurseries - are third in the volume of nursery stock when compared with garden stores and garden departments in chain stores, and with landscape nurserymen and landscape contractors, many mail order nurseries have also begun to sell fertilizer, pest control materials, and small tools and equipment.

III. History and Development of the Nursery Industry.

A. When the pioneers pressed westward and began to establish homesteads they found the one item missing from their diet was fresh fruit and berries. The need for fresh fruit was filled partially by shipping in fruit in barrels of water. This method was expensive, the deliveries were undependable, and the quality of fruit low.

B. A more stable method of supplying fresh fruit was to grow them. The first fruit transplants were imported from Europe, but again this supply of live trees was not dependable with the plants arriving damaged or dead, arriving at the wrong season for planting, and they were expensive.

INFORMATION SHEET

C. One of the first businesses to appear on the new frontier was nurseries. Practically every nursery started by producing fruit trees and berry plants for transplanting with apple trees being the mainstay of their business.

D. The first commercial nursery on the North American Continent was established in 1730 at Flushing, Long Island, N.Y., by Robert Prince. He obtained his seeds and cuttings or ornamental trees and shrubs from the French Huguenots who brought them to the Western Hemisphere.

E. The oldest continous operating nursery in the United States is the Stark Brothers Nurseries of Louisiana, Missouri. This nursery was established in 1816.

F. The early day nurseries in Kansas orginated in the Leavenworth area. The oldest known nursery in Kansas still operating under the same name is the Mount Hope Nursery at Lawrence. It was founded in 1869.

G. The Willis Nursery of Ottawa followed in 1872. It was founded in 1872 by Mr. A. Willis to grow apple trees under contract for others.

H. The Skinner's Nurseries of Topeka was founded in 1892 by Mr. J. H. Skinner. This nursery became well known in the United States in the 1920's when Mr. Skinner demonstrated that fruit tree seedlings for grafting stock could be grown in the U.S. to supply the need caused by the 1916 embargo on European nursery stock. During this time the Kansas River Valley from Perry to Silver Lake became the fruit tree seedling growing center of the U.S.

I. Among the first non-fruiting plant to be sold by nurseries in Kansas was the Osage orange seedling (hedge tree). Since there was not much suitable fencing material available on the plains Osage orange was planted to form living hedge fences. Later when barbed wire became available the Osage orange was used for fence posts.

J. The first evergreens to grown commercially were raised by Robert Douglas in Illinois in 1844.

K. The practice of keeping nursery stock over winter in a cellar storage, which revolutionized the nursery industry in the United States, was introduced by William Heikes in Alabama around 1850.

L. The markets for nursery stock expanded with the development of improved transportation [illegible] the form of canals and railroads in early part of the 19t[illegible]y.

M. Early nurseries produc[illegible]tly fruit trees for farm orchards. During the 1920's the demand for shade trees, shrubs, and roses began to equal, and finally surpass, the demand for fruit trees.

N. Due to transportation problems early nurseries merchandised their plants through sales agents (traveling salesmen). These salesmen traveled from farm to farm selling fruit trees and ornamental plants from lithograph pictures. These orders then went back to the nurseries where at the proper time for planting the nurseries would ship the plants bare root to a shipping agent, many times a railroad freight agent, who would notify the farmer that his plants had arrived and would fill the orders.

INFORMATION SHEET

O. The development of the parcel post system and Rural Free delivery made it possible for customers to order and receive nursery stock by mail.

P. The Depression of the 1930's led nurserymen to start marketing through department stores and discount houses.

Q. The development of garden stores came after World War II. They became popular because they eliminated the necessity for stopping at a hardware store for seeds, fertilizer, and handtools, at an equipment dealer for garden equipment, and at a nursery for plants.

R. Kansas nurserymen have been very active in the American Association of Nurserymen. In the history of the association Kansas has supplied four of its presidents:

1893-94	Mr. U. B. Pearsall of Fort Scott
1898-99	Mr. A. L. Brooks of Topeka
1909-10	Mr. F. H. Stannard of Ottawa
1973-74	Mr. Harold Crawford of Ottawa

Mr. John J. Pinney, a nurseryman in Ottawa, who was formally associated with the Willis Nursery has written numerous books and articles for the association.

IV. Nursery Site Selection

A. Nurseries are generally located on gently rolling land, or land with a slight slope, rather than low flat land.

B. Young plants need adequate water, evenly supplied throughout the growing season. Adequate supplies of good water are needed for propagation greenhouses and cold frames, as well as for container-grown stock.

C. Another factor that governs the location of a nursery is the kind of soil needed for producing the plants. Plants that are sold B & B (balled and brulapped) must be grown in a loam or clay-loam soil so that when the plants are dug the soil ball will hold together. Special soil mixtures are used for container-grown stock, and an adequate source of good soil must be available for producing plants in this way.

D. Nurseries are generally located 15 to 30 miles from large cities in order to avoid high tax rates. This also gives them greater flexibility in expanding the size of the operation in the same location if this becomes desirable.

E. Air pollutants from certain kinds of manufacturing processes have been found to damage plants as much as 50 miles downwind (prevailing wind) from the industrial plant. For safety from plant damage, then, a nursery should not be located on the downwind side of an industrial area.

INFORMATION SHEET

V. Nursery Facilities, Arrangement, and Layout

A. The facilities in a wholesale nursery include structures for the propagation of plants, for growing small plants, equipment and supply storage buildings, plant storage buildings, a grading room, a holding shelter, a loading dock, and an office building.

B. The buildings and growing areas in a nursery are usually arranged in kind of assembly line based on the steps involved from the propagation of the plants to the shipping of them.

C. The office is generally close to the highway for the convenience of customers and employees, and for efficiency.

D. The storage, packing, and handling of the plants are usually done in one large building which also has a loading area.

E. The propagation greenhouses, seed beds, lathhouse, and coldframes are generally located close to the storage buildings for convenience. A "headhouse", or workroom, is usually connected to the greenhouse.

F. A river or a pond may be a source of water for irrigation purposes, although some nurseries buy water from public utilities at commercial rates.

VI. Large Equipment

A. Probably the single most important item of large equipment in a nursery is the tractor.

B. Tractor attachments that are commonly used in nurseries are: plows, harrows, cultivators, planters, root pruners, plant diggers, scoops, spreaders, mowers, sprayers, and dusters. Trucks, wagons, and fork lifts are also used.

VII. Small Equipment

A. Garden tillers are often used for the preparation of seed beds and for the cultivation of small soil areas to control weeds.

B. Steam chests for treating soil may be made of wood or metal.

C. Cement mixers are very convenient for mixing the growing mediums for propagation beds and container stock.

D. Some of the hand tools commonly used in nurseries are listed below, together with some notes about their desirable qualities:

Spade - tree digging, metal shank
Spade - shrub digging, metal shank
Spading fork - metal shank
Scoop shovel - metal shank
Shovel - metal shank
Planting bar - metal shank
Lopping shear
Hand pruners

INFORMATION SHEET

Pole pruner
Garden trowel, welded metal shank
Grafting knife
Budding knife
Pruning knife
Nursery hoe
Rake
Pitchfork
Tree caliper
Knapsack sprayer
Hand duster (crank type)
Fertilizer injector

VIII. Supplies

A. Supplies are the materials that are expended in the processes of producing nursery plants for sale. Supply items include plant material, containers, fertilizer, herbicides, soil and soil amendments, insecticides and fungicides, burlap and twine, labels, and shipping supplies.

NURSERY OPERATIONS

UNIT 1

ASSIGNMENT SHEET 1 : Research on the Types and Kinds of Nurseries in the Community.

I. Select one of the various nurseries visited and write a report on methods used and the results.

II. Give the report orally to the class if the instructor so desires.

NURSERY OPERATIONS

UNIT 1

TEST

1. Matching:

______ a. A small plant of suitable size for planting in rows (lines) in a nursery

______ b. a part of a plant, usually a stem or root piece that is induced to produce roots and to grow into a new individual plant.

______ c. Trees whose leaves fall off in autumn.

______ d. A merchant who sells goods in small quantities direct to the consumer.

______ e. Temporarily placing newly dug stock in a trench with roots covered with moist soil, peat, or shingletow.

______ f. Saleable products; in a nursery it refers to plant material.

______ g. A young plant of suitable for planting in a permanent position.

______ h. One who sells stock in large quantities to the retailer.

______ i. Plants that require exposure to the winter season before they can flower, require two growing seasons to flower.

______ j. A business firm that propagates, grows, and sells trees, shrubs, vines, and flowering plants.

1. Retailer
2. Heeling in
3. Liner
4. Deciduous trees
5. Stock
6. Wholesaler
7. Transplant
8. Cutting
9. Nursery
10. Biennial
11. Insecticide

2. Choose from the following statements those that relate to nursery facilities, arrangement, and layout.

______ a. Headhouses are usually not connected to the greenhouse

______ b. The building and growing areas in a nursery are usually arranged in a kind of assembly line.

______ c. The office is generally close to the highway for the convenience of customers and employees.

TEST

3. List four types of nurseries.

4. Name the two common methods of merchandising used by the early nurseries to sell their plants over a wide area.

5. Matching:

______k. The first nursery to successfully grow apple seedlings for grafting in the United States.

______l. The earliest nurseries in Kansas were established in the area of___

______m. The name of the oldest, continuously operating nursery in Kansas.

______n. Skinner's Nursery was established in what year.

______o. The second oldest, continuously operating nursery in Kansas.

______p. Mount Hope Nurseries of Lawrence was established in ______.

______q. Willis Nurseries of Ottawa was established in ______.

12. 1892
13. Mount Hope Nursery
14. Leavenworth
15. Skinner's Nursery
16. 1869
17. Willis Nursery
18 1872

6. Identify as true or false the following statements concerning the history and development of the nursery industry.

______a. The development of the mail order nurseries came after World War II.

______b. The first commercial nursery in the United States was established in 1730 at Flushing, Long Island, N.Y. by Robert Prince.

______c. Early nurseries, prior to the 1920's produced mostly shade and ornamental plants.

______d. The first evergreens to be grown commercially were raised in 1844.

______e. The depression of the 1930's led nurserymen to start marketing through the mail.

7. State two reasons for locating nurseries some distance (15-30 miles) from large cities.

TEST

8. Match the type of nurseries to the following statements:

______a. Limit their production to a particular kind of plant or a particular group of plants.

______b. Sells and plants landscape jobs.

______c. Grows nursery plants to marketable size and sells them in large lots to retail outlets.

______d. Third in volume in the amount of nursery stock sold.

1. Landscape Nursery
2. Wholesale Gower Specialists
3. Mail Order Nursery
4. Wholesale Grower Nursery

GREENHOUSES

UNIT 1

PLANT GROWING STRUCTURES

TERMINAL OBJECTIVE

Upon completion of this unit, the student will describe the uses of a greenhouse and other plant growing structures. Students will also name the parts of a greenhouse and give reasons for locating the operations in certain areas. The student will have completed this objective upon attainment of a score of at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, students will be able to:

1. Match terms with their definitions concerning plant growing structures.
2. List three purposes of greenhouse structures.
3. Discuss in a short paragraph where a greenhouse range should be located including at least eight factors that help determine the location.
4. Identify the parts of a greenhouse structure.
5. Name four common greenhouse glazing materials.
6. List three other plant growing structures and describe one feature that identifies each one.
7. Design and assemble a model of a greenhouse structure. (Job Sheet #1)
8. Demonstrate ability to glaze a glass greenhouse by glazing a practice frame. (Job Sheet #2)

GREENHOUSES

UNIT 1

INFORMATION SHEET

I. Terms and Definitions:

- A. Boiler - A piece of equipment used for boiling or heating water
- B. Cold frame - A low plant growing structure heated only by the sun through transparent glazed sashes
- C. Condensate - Water droplets formed from moisture in the air
- D. Cyclic lighting - Short interruptions during the dark period using artificial light
- E. Diffuse - Complete mixing of two gases or liquids
- F. Foot candle - The amount of light given by a standard candle at a distance of one foot
- G. Framework - The basic or principal part of something
- H. Glazing - A hard, smooth, or shiny substance or coating used to cover a surface
- I. Hot bed - A low plant growing structure, glazed with transparent material; heated by the sun and other supplemental heat
- J. Light intensity - The strength of light
- K. Mist - Water in the form of small droplets floating or falling in the air
- L. Photoperiod - length of day or days required by a plant to carry out certain plant functions
- M. Range - A group of greenhouses under one operation
- N. Relative humidity - The amount of moisture in the air as compared to the amount of moisture the air can hold at a given temperature
- O. Respiration - The process by which a living organism or cell takes in oxygen, gives off CO_2 and releases energy to be used by the cells
- P. Shade - Reduced light intensity
- Q. Soil structure - The clumping into larger units of individual soil particles
- R. Structure - Buildings
- S. Subirrigation - Adding water from below the soil surface
- T. Syringing - To lightly moisten - usually the vegetative parts of the plant
- U. Texture - Refers to the size of soil particles, such as sand, silt, or clay
- V. Thermostat - A device for automatically regulating temperature
- W. Transite - A thin sheet composed of a mixture of asbestos and concrete
- X. Ventilation - The process of circulating fresh air

INFORMATION SHEET

II. Purpose of Greenhouse Structures

1. Possible to flower and vegetable crops the year around
2. Temperature, light, relative humidity, CO_2 level can be controlled

III. Factors that determine the location of Greenhouse Ranges

1. Ranges that produce potted flowering plants, foliage plants, and bedding plants are located within 100 miles of their markets. (SEE TM 1)
2. Greenhouse vegetable crops are generally marketed within several hundred miles of the ranges producing them
3. The weight of the product is the limiting factor in shipping the greenhouse product long distances
4. Cut flowers other than snapdragons and standard mums can be shipped long distances-up to half-way around the world
5. Adequate transportation facilities are important to ranges
6. The amount of winter sunlight is important in greenhouse production
7. Frequency of severe weather such as hail storms, high winds, snow blizzards, etc., are important
8. Good quality water is needed for healthy plants
9. Availability and cost of fuel for heating must be considered
10. Availability of electricity is a factor
11. Labor availability is a high priority
12. Taxes often determine where a greenhouse range is built

IV. Parts of a Greenhouse (see TM 2 & 3)

1. footing
2. curtain wall
3. side wall
4. side ventilation
5. eave
6. rafter
7. truss
8. strut
9. purlin
10. ridge vent
11. ridge and ridge cap
12. sash bar

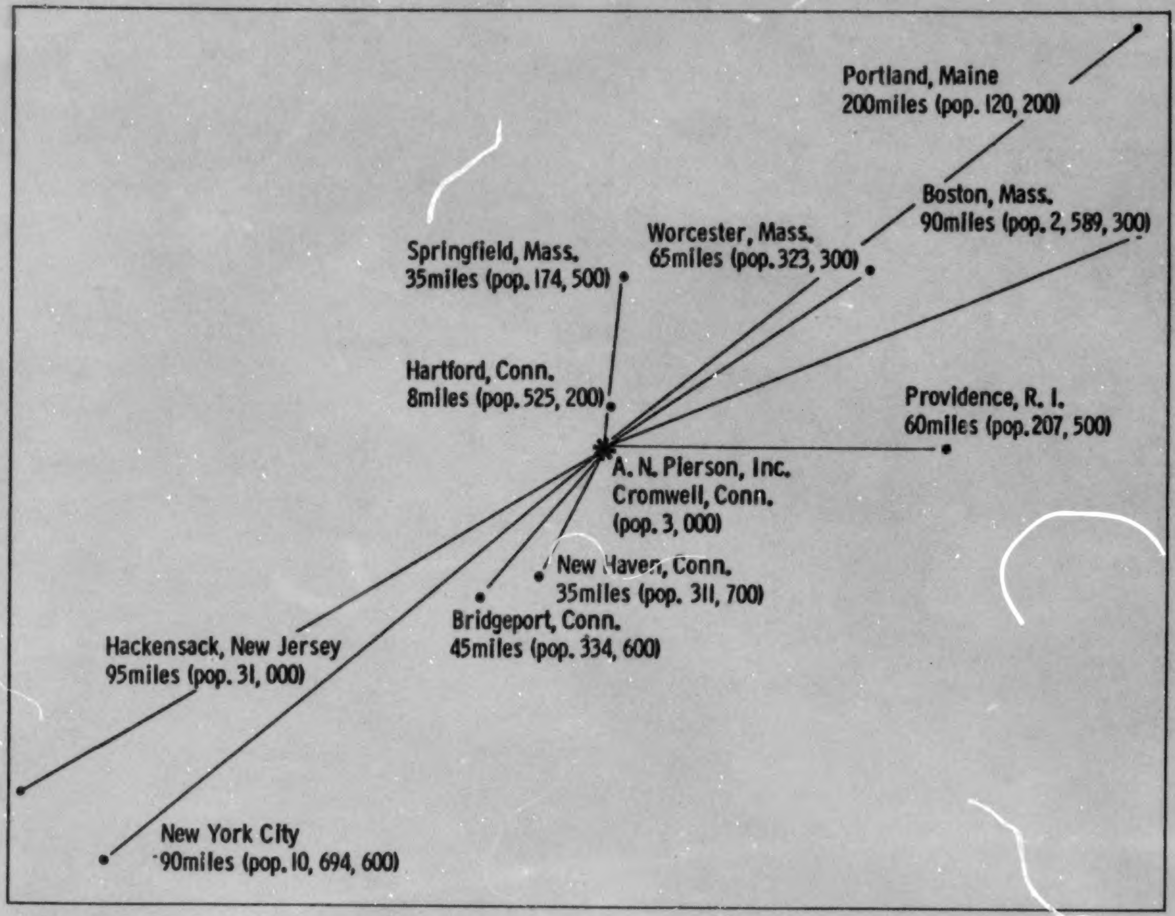
INFORMATION SHEET

V. Greenhouse Glazing Materials

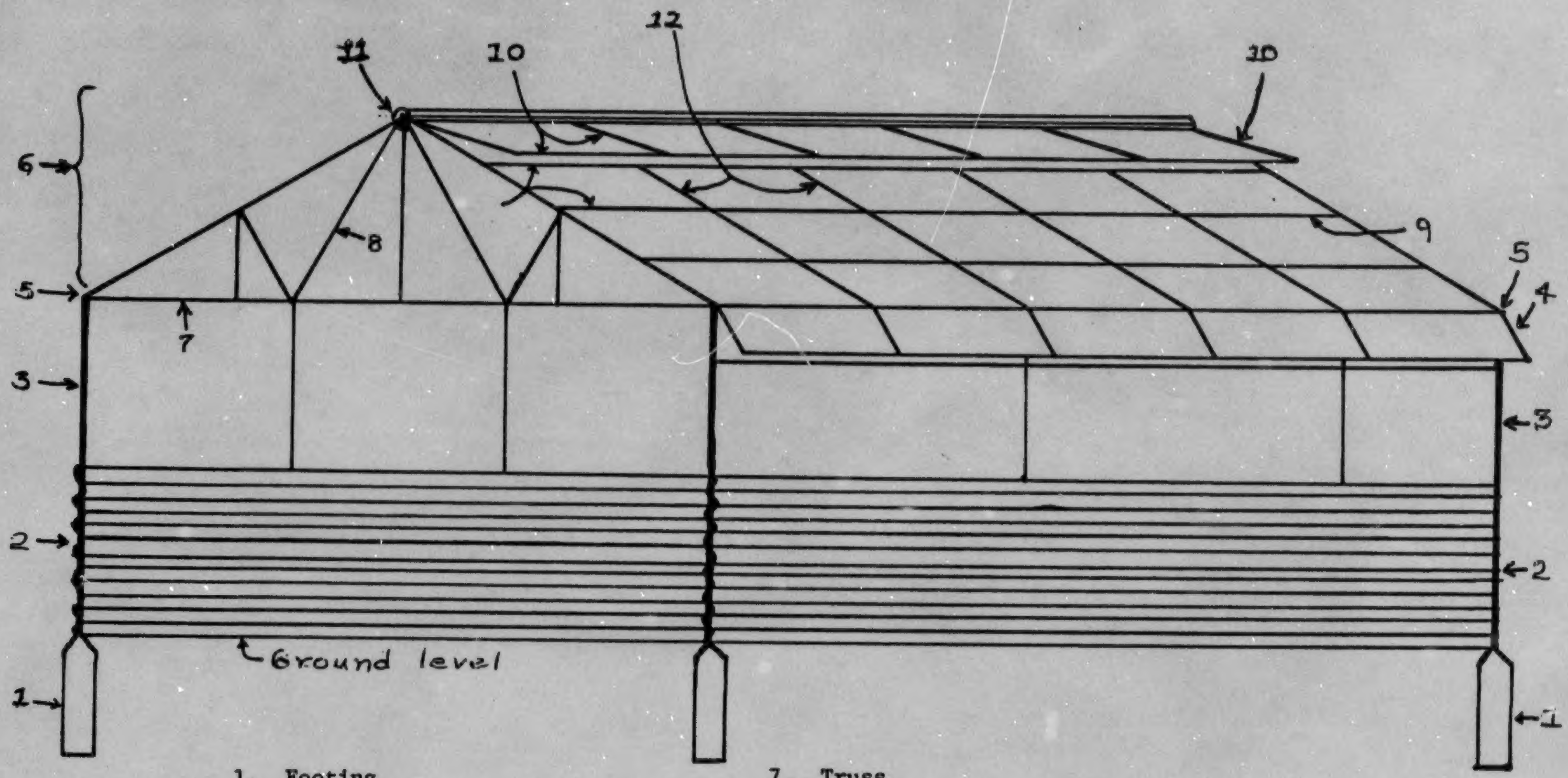
1. Glass - Has been used for many years
2. Plastic film - Economical and easily installed
3. Polyethylene film - Low cost
4. Vinyl film (PVC) - More durable than polyethylene
5. Mylar polyester film - Lasts longer than PVC
6. Fiber glass - Original cost is more than glass but maintenance cost is much less

VI. Other Plant Growing Structures (see TM 4,5,6)

1. Cold frames - Used primarily for hardening off of bedding plants
    a. Can also be used for growing certain crops during the summer
    b. Uses only sunlight for heat source
2. Hotbed - Similar to cold frame but has supplemental heat
    a. Use to start bedding plants
    b. Can also be used as cold frame
3. Lathhouse - Structure with alternating slots and spaces that allows for partial shade and adequate ventilation
    a. Used for production and storage of crops such as:
        1. Azaleas
        2. Hydrangeas
        3. Evergreen nursery stock


Portland, Maine
200miles (pop. 120, 200)
Boston, Mass.
90miles (pop. 2, 589, 300)
Worcester, Mass.
65miles (pop. 323, 300)
Springfield, Mass.
35miles (pop. 174, 500)
Hartford, Conn.
8miles (pop. 525, 200)
Providence, R. I.
60miles (pop. 207, 500)
A. N. Pierson, Inc.
Cromwell, Conn.
(pop. 3, 000)
New Haven, Conn.
35miles (pop. 311, 700)
Bridgeport, Conn.
45miles (pop. 334, 600)
Hackensack, New Jersey
95miles (pop. 31, 000)
New York City
90miles (pop. 10, 694, 600)

Marketing area for potted plants for A. N. Pierson, Inc., Cromwell, Connecticut.


11
10
12
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6
8
9
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7
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3
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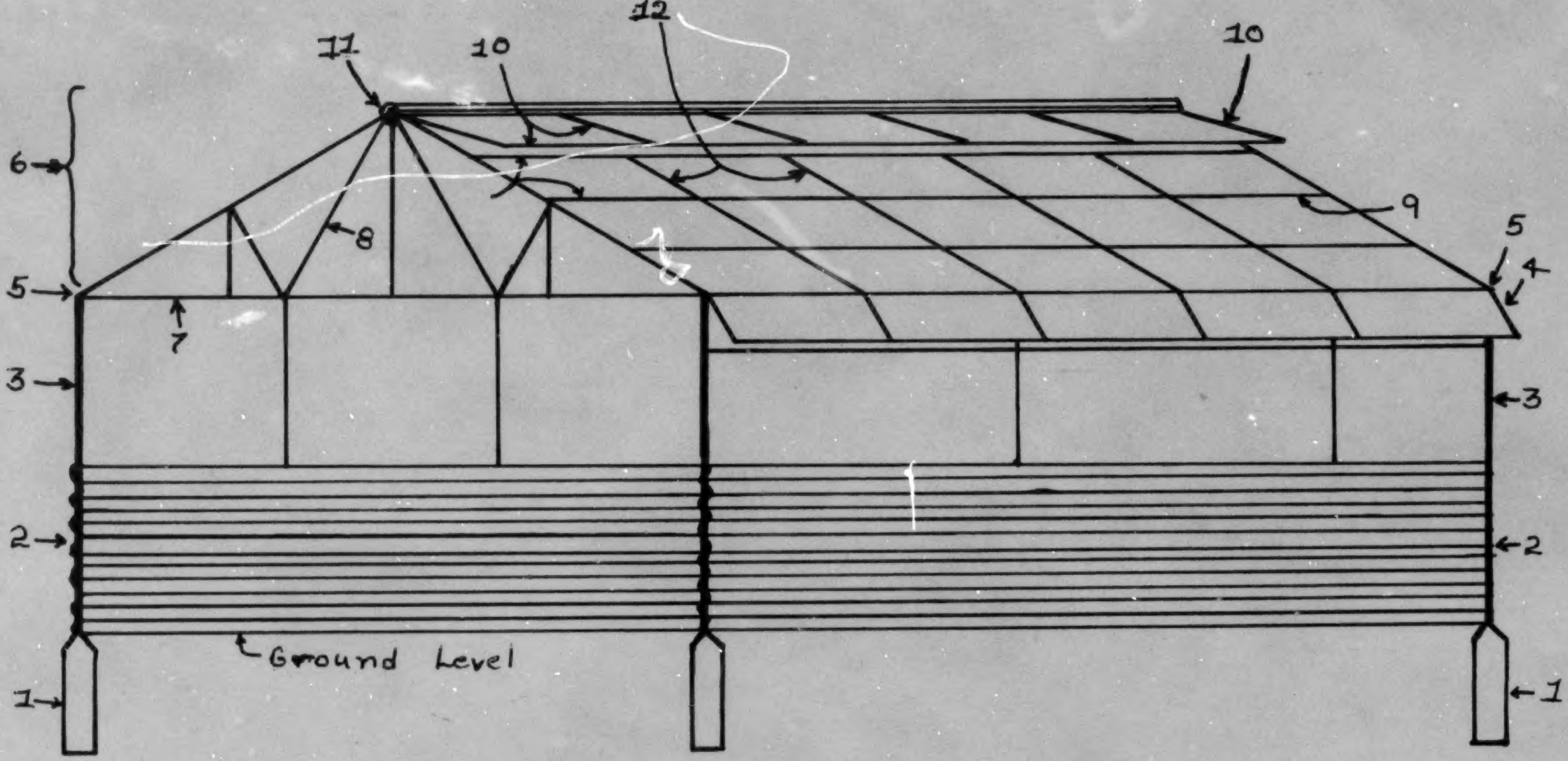
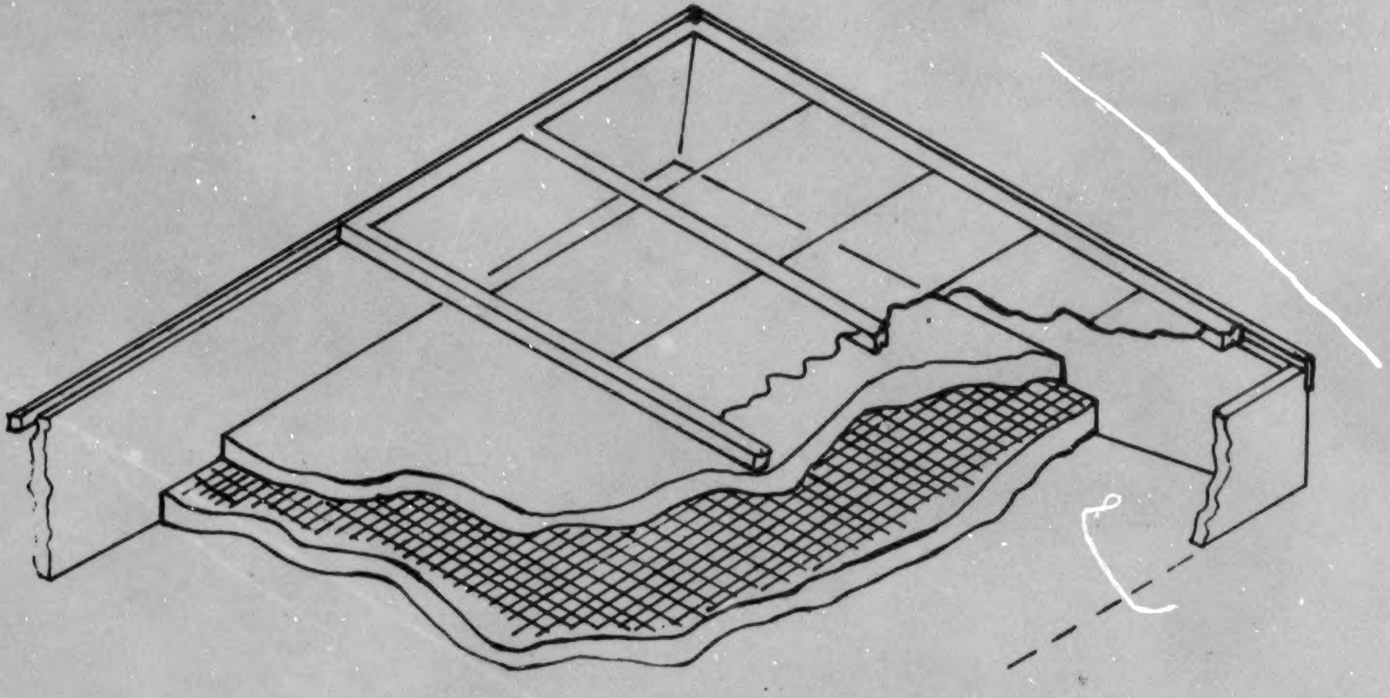
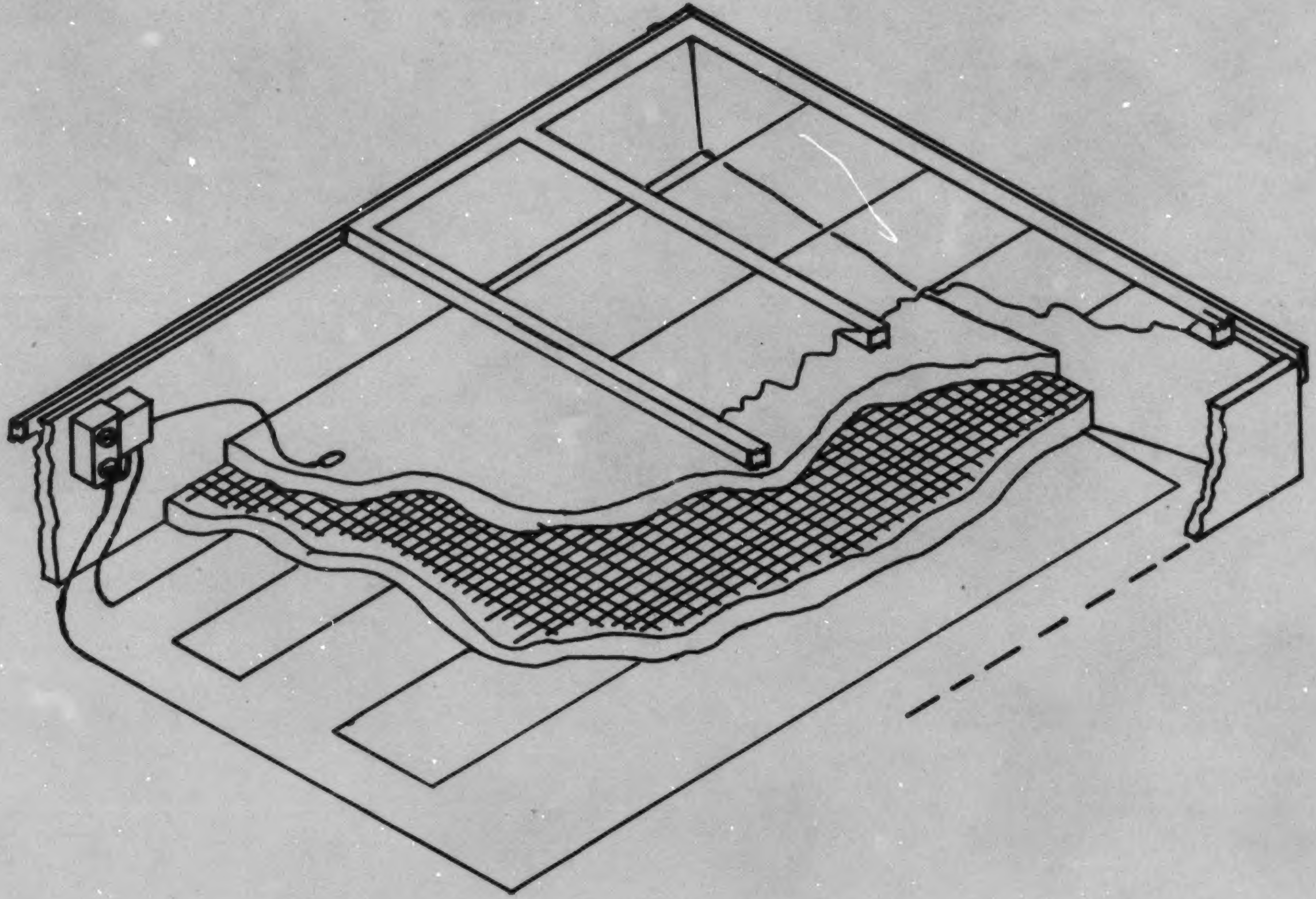
2
Ground level
1
1

1.	Footing	7.	Truss
2.	Curtain wall	8.	Strut
3.	Side wall	9.	Purlin
4.	Side ventilator	10.	Ridge vent
5.	Eave	11.	Ridge and ridge cap
6.	Rafter	12.	Sash bar


Ground Level





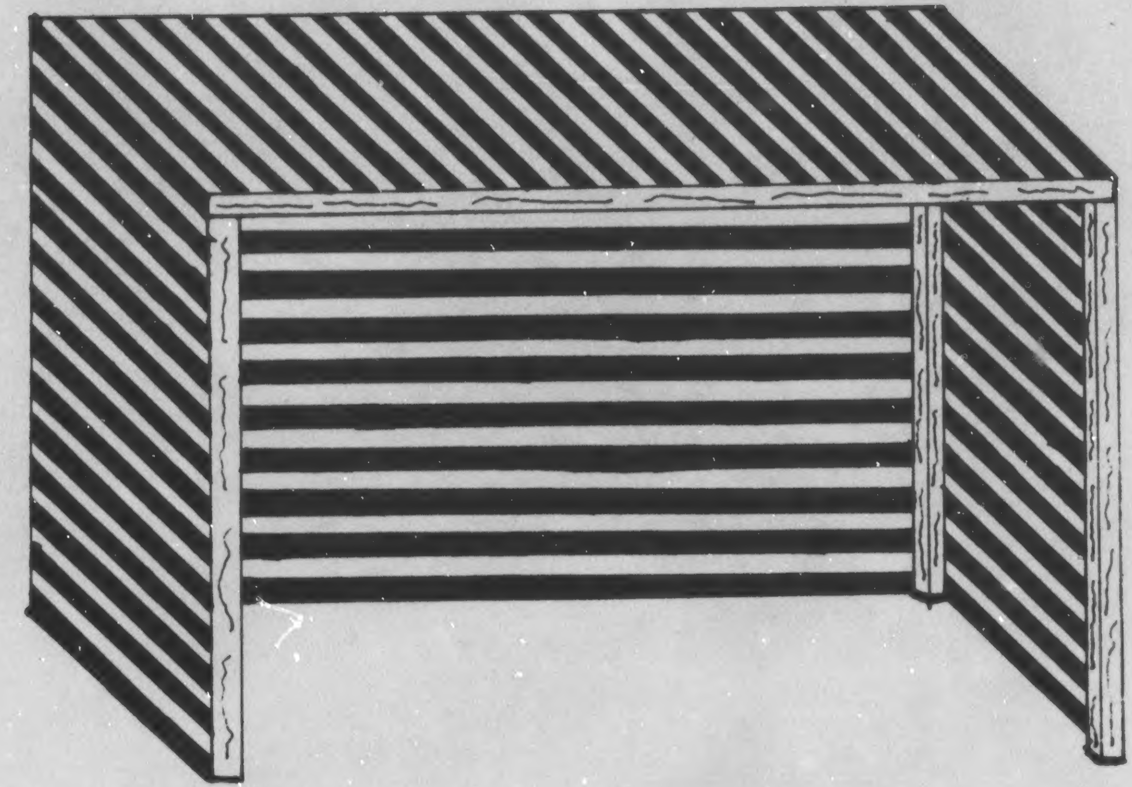


FIG. 1

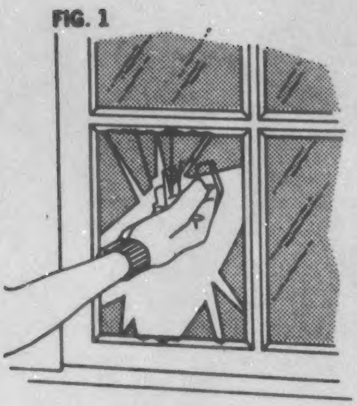


FIG. 2

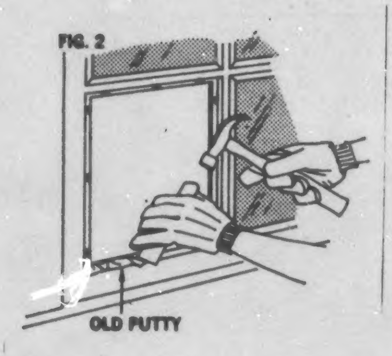


FIG. 3

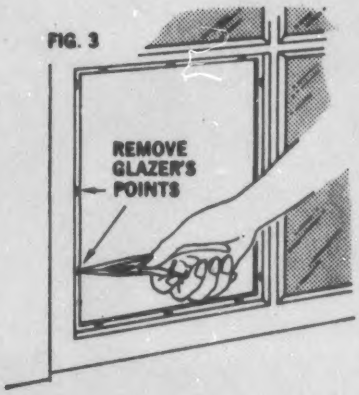

REMOVE
GLAZER'S
POINTS

FIG. 4 MEASURING FOR CARDBOARD PATTERN

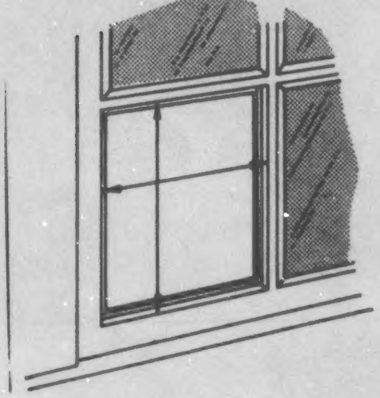
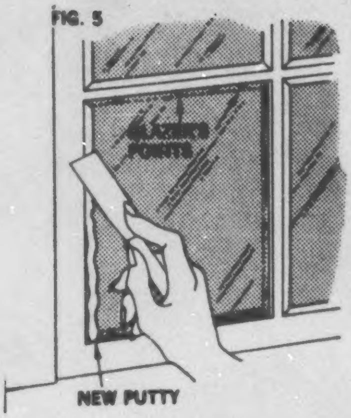


FIG. 5


GLAZER'S
POINTS
NEW PUTTY

GREENHOUSES
UNIT 1

JOB SHEET #1: Greenhouse Construction

I. Materials required:

1. Plywood or similar material ¼" thick and 18" x 24" to be used as a base for each model.
2. Balsa or other available model-making wood.
3. Glue, wire, pins, polyethylene etc.

II. Procedure:

1. Students may work individually or in teams.
2. Each individual or team must have one model base.
3. Students will review references and after consultation with teacher, develop a plan for the type of greenhouse they will construct.
4. Glazing with polyethylene may be done as well as addition of benches, ventilating systems, etc.
5. Use models for educational and promotional purposes.
6. Suggested greenhouse designs
   a. Even span solitary
   b. Even span ridge and furrow
   c. "A" frame
   d. Gothic
   e. "Lean-to"

GREENHOUSES

UNIT 1

JOB SHEET #2: Glazing

I. Materials Needed:

1. Practice frame of aluminum or wood (1 frame for each group of three students).
2. Three panes per frame plus bar caps, screws, points bedding compound, and tools.

II. Procedure: (See TM 7)

1. Teacher will demonstrate proper glass replacement procedure including cutting one pane in half to fit the frame.
2. Students will be assigned in to groups so each individual can obtain experience. Students should work individually to complete and dismantle the 2½ panes while the rest in the group observe.

GREENHOUSES

UNIT 1

TEST

I. Match the following terms with the correct definitions:

_____ A. Hotbed
_____ B. Respiration
_____ C. Boiler
_____ D. Light Intensity
_____ E. Condensate
_____ F. Thermostat
_____ G. Ventilation
_____ H. Transite
_____ I. Structures
_____ J. Foot candle
_____ K. Cold frame
_____ L. Diffuse
_____ M. Texture
_____ N. Syringing
_____ O. Shade
_____ P. Cyclic Lighting
_____ Q. Glazing
_____ R. Photoperiod
_____ S. Range
_____ T. Soil Structure
_____ U. Frame work
_____ V. Subirrigation
_____ W. Mist
_____ X. Relative Humidity

1. To lightly moisten, usually the vegetative plant parts.
2. The process of circulating fresh air.
3. The basic or principal part of something.
4. A piece of equipment used for heating or boiling water.
5. The amount of light given by a standard candle at a distance of one foot.
6. Water droplets formed from moisture in the air.
7. The process by which a living organism or cell takes in oxygen, gives off CO_2 and releases energy to be used by cells.
8. A thin sheet composed of a mixture of asbestos and concrete.
9. Refers to the size of soil particles such as sand, silt and clay.
10. Reduced light intensity.
11. A low plant growing structure heated by the sun and other supplemental heat and glazed with transparent material.
12. Length of day or days required by a plant to carry out certain plant functions.
13. The amount of moisture the air as compared to the amount of moisture the air can hold at a given temperature.
14. A hard, smooth, or shiny substance or coating used to cover a surface.
15. Short interruptions during the dark period using artificial light.
16. A low plant growing structure heated only by the sun through transparent glazed sashes.
17. The strength of light.

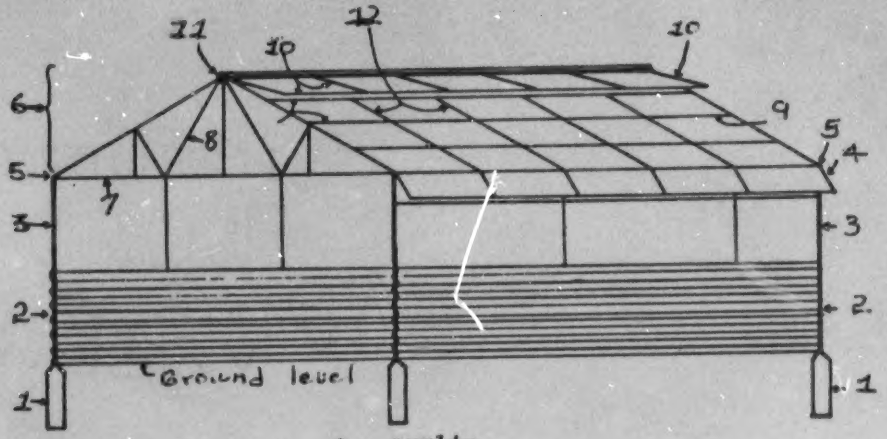
TEST

18. A group of greenhouses under one operation.
19. Complete mixing of two gases or liquids.
20. A device for automatically regulating temperature.
21. The clumping into larger units of individual soil particles.
22. Water in the form of small droplets floating or falling in the air.
23. Adding water from below the soil surface.
24. Buildings.

II. List three purposes of greenhouses.

III. Discuss in a short paragraph where a greenhouse range should be located including at least eight factors that help determine its location.

IV. Identify the following parts of a greenhouse:



a.	sash bar	g.	purlin
b.	truss	h.	side wall
c.	curtain wall	i.	strut
d.	ridge and ridge cap	j.	ridge vent
e.	rafter	k.	footing
f.	eave	l.	side ventilator

TEST

1. ______
2. ______
3. ______
4. ______
5. ______
6. ______
7. ______
8. ______
9. ______
10. ______
11. ______
12. ______

V. Name four greenhouse glazing materials.

VI. List three plant growing structures other than greenhouses, and describe one feature that identifies each one.

FLORICULTURE

UNIT 1

USES AND CHARACTERISTICS OF FLOWERS, PLANTS, AND DECORATIVE MATERIALS

TERMINAL OBJECTIVE

Upon completion of this unit, students will be able to identify the more common cut flowers, cut foliage, flowering pot plants, foliage pot plants, floral pot plants, floral wire sizes and ribbon sizes, and be able to list the uses of the above materials. This objective will be considered achieved by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVE

After completion of this unit, students will be able to:

1. Define terms related to cut flowers, greens, pot plants, and decorative materials.
2. List and/or identify as least ten of the more common cut flowers.
3. List and/or identify ten of the more common florist greens.
4. List at least two characteristics of florist greens.
5. List and/or identify at least eight of the more common flowering pot plants.
6. Identify or list at least eight of the more common foliage pot plants.
7. List two types of wire used by the florist.
8. List five uses for wire as used by the florist.
9. Identify and/or list two types of ribbon.
10. List the uses for at least two types of ribbon.
11. Define the sizes of ribbon and wire.
12. List four types of flower dyes.
13. Describe the special care of dyed flowers.

FLORICULTURE

UNIT 1

INFORMATION SHEET

I. Terms and Definitions:

  A. Cut flowers - flowers removed from plant

  B. Flowering Pot Plant - plant grown for its flowers and marketed in a container

  C. Foliage Pot Plant - plant grown for its leaves and marketed in in a container

  D. Greens - foliage cut and used in arrangements

  E. Gauge - Measurement of wire size

  F. Novelty - Different or unusual

II. Some of the more common cut flowers used for flower arranging and corsage work include:

  A. Aster

  B. Carnation

  C. Chrysanthemum

  D. Gardenia

  E. Gladioli

  F. Iris

  G. Sweetheart rose

  H. Snapdragon

  I. Standard rose

  J. Stocks

  K. Bulb Flowers

    1. Daffodils

    2. Lily

    3. Tulip

  L. Orchids

    1. Cattleya

    2. Cymbidium

  M. Baby's Breath

INFORMATION SHEET

III. Foliage for Flower Arrangements or Corsage Work (Greens)

   A. Types

      1. Salal or lemon leaf
      2. Huckleberry
      3. English ivy
      4. Asparagus fern
         a. sprengeri
         b. plumosus
      5. Eucalyptus
      6. White pine
      7. Leather leaf fern
      8. Palm
         a. Emerald
         b. Jade
      9. Ti leaves
      10. Galax
      11. Lycopodium
      12. Scotch Broom
      13. Boxwood
      14. Holly

   B. Characteristics

      1. Grown in greenhouses, on greens-farms in Florida and South America, and gathered from wild plants in the northeast, northwest, west and southern United States
      2. Fresh foliage will outlast the flowers with which they are used. Most will last from 10 to 14 days
      3. Fresh greens have bright colors
      4. Old greens have dull colors and often have brittle leaves and stems

IV. Flowering Pot Plants: Most Will Last 14 to 21 Days With Good Care

   A. African violets
   B. Begonias
   C. Geraniums
   D. Gloxinias
   E. Hydrangeas
   F. Azalea
   G. Chrysanthemum

INFORMATION SHEET

H. Cyclamen

I. Poinsettia

J. Easter Lily

K. Kalanchoe

L. Christmas Cactus

V. Foliage Pot Plants: With Proper Care Will Last 6 to 9 Months or Longer in the Home

A. Philodendron

B. Peperomia

C. Dracaena

D. Dieffenbachia

E. Pathos

F. Spider or Airplane Plant

G. Rubber plant

H. Dwarf palm

I. Schefflera

J. Jade plant

K. Boston fern

VI. Wire

A. Types

1. Eighteen-inch lengths of wire
    a. Sold in lots of twelve pounds to the box
    b. Comes plain or enameled green
    c. Gauges vary from No. 16 through No. 36
2. Bulk on spools
    a. One quarter pound on each spool
    b. Length varies according to guage

(NOTE: The larger the number the smaller the wire.)

B. Uses of Wire

1. To curve a stem into the position or line desired
2. To straighten a crooked stem
3. To strengthen a weak stem and preven drooping
4. To group small stemed flowers into mass effects
5. To stabilize the arrangement
6. To construct a composite flower

INFORMATION SHEET

   7. To reduce weight in corsages and wedding bouquets by replacing stems
   8. To prevent flowers from showing wilt in arrangements made up without water
   9. To add strength and rigidity to stems
   10. To lengthen stems.

VII. Ribbon

- A. Types
  - 1. Novelty
  - 2. Satin
  - 3. Mettaline
  - 4. Velvet
- B. Uses
  - 1. Novelty - follows the fasion trends, varies from year to year; season to season
  - 2. Satin - wedding, corsage and expensive funeral work
  - 3. Mettaline - (Spray ribbon) moderately priced funeral work
  - 4. Velvet - wedding and corsage work

II. Flower Dyes: Used to Obtain Desired Colors of Flowers and Materials

- A. Types and methods of use:
  - 1. Absorption of dye by the flower up the stem
    - a. Allow fresh cut flowers to loose some moisture
    - b. Recut stems and place in dye solution.
    - c. Keep at room temperature until desired color is obtained.
  - 2. "Dip and rinse"
    - a. Have blooms and solution at room temperature
    - b. Dip flowers and rise in clear water
    - c. Redip to darken color

INFORMATION SHEET

3. "Dip and NO rinse"
   - a. Have blooms and solution at room temperature
   - b. Dip each flower separately
   - c. Dip for about twenty seconds
   - d. Twirl slightly to remove excess
4. Spraying colors from pressurized cans
   - a. Considered the most efficient and economical way of tinting
   - b. Available in natural and soft-toned and metallic kinds

(NOTE: In all types, follow directions for use given on containers!)

B. Special care of tinted and dyed flowers

1. Allow to dry for at least one hour before carried or worn
2. If dyed flowers get wet, they will stain clothing

FLORICULTURE

UNIT 1

ASSIGNMENT SHEET #1: Cut Flower Information

For each of the following flowers, give this information:

A. Picture
B. Season of sales.
C. Colors available.
D. How sold
    1. Wholesale
    2. Retail
E. Special treatment if needed
F. Scientific name (optional with instructor).
    1. Aster
    2. Carnation
    3. Chrysanthemum
    4. Gardenia
    5. Gladioli
    6. Iris
    7. Sweetheart rose
    8. Snapdragon
    9. Standard Rose
    10. Stocks
    11. Daffodils
    12. Lily (Spring)
    13. Tulip
    14. Cattleya
    15. Cymbidium
    16. Baby's Breath

FLORICULTURE

UNIT 1

ASSIGNMENT SHEET #2: Cut foliage or greens information

For each of the following cut foliages give this information:

A. Picture
B. Seasons available
C. How stored
D. How used: Arrangements, corsage work, wedding work, funeral work.
E. How sold: bunch, individual leaf, by weight, etc.

1. Salal or lemon leaf
2. Huckleberry
3. English ivy.
4. Sprengeri fern
5. Plumosus fern
6. Eucalyptus
7. White pine.
8. Leather leaf fern
9. Emerald plam.
10. Jade palm
11. Ti leaves
12. Galax
13. Lycopodium
14. Scotch broom
15. Box wood
16. Holly

FLORICULTURE

UNIT 1

ASSIGNMENT SHEET #3: Flowering Pot Plant Information

For each of the following flowering pot plants give this information:

A. Picture

B. Seasons available for sale

C. Colors available

D. How sold:

   1. Wholesale
   2. Retail

E. Home care

F. Scientific name (optional with instructor)

1. African violet
2. Begonia
3. Geranium
4. Gloxinia
5. Hydrangea
6. Axalea
7. Chrysanthemum
8. Cyclamen
9. Poinsettia
10. Easter lily
11. Kalanchoe
12. Christmas Cactus

FLORICULTURE

UNIT 1

ASSIGNMENT SHEET #4: Foliage Pot Plant Information

For each of the following foliage pot plants give this information:

A. Picture
B. Seasons available for sale
C. Light requirements
D. Water requirements
E. How sold:
    1. Wholesale
    2. Retail
F. Scientific name (Optional with teacher).

1. Philodendron
2. Peperomia
3. Dracaena
4. Dieffenbachia
5. Pothos
6. Spider or airplant plant
7. Rubber Plant
8. Dwarf palm
9. Schefflera
10. Jade plant
11. Boston fern

FLORICULTURE

UNIT 1

TEST

1. Define the following terms:
   - A. Cut flower:
   - B. Flowering pot plant:
   - C. Foliage pot plant:
   - D. Gauge:
   - E. Greens
   - F. Novelty

2. List ten of the common cut flowers:

3. List ten of the common florist greens:

4. List two characteristics of greens:

5. List eight of the common flowering pot plants:

6. List eight of the common foliage pot plants:

7. List two types of wire used by the florist:

8. List two types of ribbon used by the florist:

9. List the uses for two types of ribbon:

10. List five uses for wire as used by the florist:

11. A. Define how wire is sized:
    B. Define how ribbon is sized:

12. List four types of flower dyes:

13. Describe the special care of dyed flower:

FLORICULTURE

UNIT 2

FLOWER ARRANGING

TERMINAL OBJECTIVE

Upon completion of this unit, students will be able to define floral design terms; to demonstrate the principles of cut flower care, flower arranging and design, and to identify the types of geometric designs, flowers, containers, holding devices, and other materials used in floral design. This objective will be considered achieved by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, students will be able to:

1. Match definitions with terms that relate to flower arranging.
2. Define the nine principles of design.
3. List at least eight of the common geometric designs.
4. Define and list the uses of the four basic flower forms.
5. List or describe the care of cut flowers.
6. List at least three types of containers used by florists.
7. List at least two types of flower holders.
8. List at least two reasons why wire is used in arrangements.
9. Identify mechanics materials used in flower arranging.

FLORICULTURE

UNIT 2

INFORMATION SHEET

I. Terms and Definitions:

A. Florets - One flower of many in a cluster.

B. Distinctive - Different from other things.

C. Delicate - Small and fine.

D. Dominate - To be outstanding or superior.

E. Composition - Arrangement into proper relationships.

F. Compliment - Something that completes or goes together with.

G. Arranging - Placing flowers so as to be pleasing to the eye.

H. Principles - Basic rules, facts or considerations.

I. Elements - Basic parts of design.

II. Principles of design.

A. Composition - The over-all shape or form of a design.

B. Harmony - Refers to an agreement among parts.

C. Focal Point - The point of emphasis in an arrangement.

D. Balance - Refers to stability.

E. Proportion - Is the size of the total arrangement in relationship to the space it is to fill.

F. Line - Refers to the underlying skeleton or linear pattern which holds the arrangement together.

G. Texture - Surface appearance of the materials used.

H. Rhythm - If you look at the arrangement and the eye movement can be organized and easy.

I. Color - Is the response of vision to wave-lengths of light reflected from an object.

Some definitions that should be helpful in understanding color and color combinations:

1. Hue - Term used to differentiate one color from another.
2. Value - Lightness or darkness of a color. Red increases in value from pink to maroon.
3. Intensity - The brilliance or purity of a color.
4. Tint - A color with white added.
5. Shade - A color with black added.
6. Tone - A color with grey (black & white added.)

Some color combinations that are useful in flower arrangement are:

1. Monochromatic - Variations of one color (tints, shades, or tones in the same color.)
2. Analogous - Three or more colors in sequence on the color wheel with only one being a primary color.
3. Complimentary - Colors opposite each other on the color wheel.
4. Split Complimentary - One color with two colors on either side of the compliment.
5. Triad - Three colors equally spaced on the color wheel.

Some general suggestions for use of color are:

1. Tints are coolor and tend to harmonize well in most combinations.
2. Shades are darker and heavy in visual weight and tend to reduce intensity of a color combination.
3. Use lighter colored flowers high and to the outside of the arrangement and darker and more intense colors toward the focal point.
4. Group colors, letting one flow into the other to produce rhythm in color harmony.
5. Use intense colors for dramatic effect.
6. For dainty, feminine arrangements, use combinations of tints.
7. Select neutral colored containers.
8. Colors are affected by artificial light. Reds tend to look normal while yellows and blues become less intense.

III. Geometric Designs.

A. Horizontal
B. Hogarth ("S" Curve)
C. Vertical
D. Inverted "T"
E. Symmetrical Triangle
F. Asymmetrical Triangle
G. Right Angle
H. Crescent
I. Circle
J. Oval
K. Spiral
L. Diagonal

INFORMATION SHEET

IV. Mechanics

A. Flower Forms:

1. Line Flowers: Tall and erect with florets blooming along the stem. Examples are stock, snapdragon, gladiolus, cattail.
2. Mass Flowers: One solid head on a single stem. Examples are: carnations, roses, aster, daisies, peony and chrysanthemums.
3. Form Flowers: Have distinctive shapes. Examples are: Bird of paradise, anthurium, wedgewood, blue dutch iris, tulip, calla and orchids.
4. Filler Flowers: Small and delicate or feathery spray flowers which "fill in" open spaces and add gentleness to arrangements. Examples are: candytuft, gypsohila, lilac, statice, sweetpeas and heather.

B. Care of cut flowers:

1. Cut early in morning or in late afternoon when cool. These times are when water content of the stem is highest.
2. Cut stems with a knife so as not to squeeze end together to hinder water uptake.
3. Crush woody stems to increase water uptake.
4. Place stems in container of lukewarm water, 100° F to 110° F for at least two hours, overnight is preferred. This is called hardening.
5. Best to use some type of commercial floral preservative.
6. Store in refrigerator 40° - 50°F.
7. Some flowers will require special treatments. Check references.

C. Containers.

1. Traditional or conventional design never allows a container to dominate a composition.
2. Flowers, container and the decor or room must compliment each other.
3. Types of containers frequently used by florist.
   - a. Pottery
   - b. Plastic
   - c. Glass
   - d. Paper mache
   - e. Metal
   - f. Wood or fiber baskets (water proof liner usually needed.)

INFORMATION SHEET

D. Mechanical Aids.

1. Flower holders or frogs:
    a. Plastic foam water holder (oasis & quickie) most commonly used by commercial florist.
    b. Chicken wire.
    c. Hardware cloth.
    d. Pin or needle holders.
2. Wire - used to:
    a. Straighten crooked stem.
    b. Curve stems
    c. Strengthen weak stems.
3. Floral Picks - used to provide stronger stems and lenghthen stems.
    a. Wood - wired and unwired.
    b. Metal - Need a pick machine to apply.
4. Waterproof tape - Used to fasten water holding foam into container.

FLORICULTURE

UNIT 2

ASSIGNMENT SHEET #1 - What is available?

Visit a local florist and make a list of the cut flowers in your area. Put flowers in flower form classification.

1. Line Flowers:

2. Mass Flowers:

3. Form Flowers:

4. Filler Flowers:

FLORICULTURE

UNIT 2

ASSIGNMENT SHEET #2 - Keeping quality of flowers.

Do the following:

A. Make a bouquet of several kinds of flowers (the same kinds to be in every vase) in containers provided (all alike).

B. Be sure to add water daily or as needed.

C. The following are some suggested treatments to be compared as the flowers retain vase life.

Treatment	Results
1. Foam in tap water, room temp.	
2. Foam in tap water, refrigerator	
3. Foam and flower-food, room	
4. Foam and flower-food, refrigerator	
5. Chicken wire, tap water, room temp.	
6. Chicken wire, tap water, refrigerator	
7. Chicken wire, flower-food, room temp.	
8. Chicken wire, flower-food, refrigerator	

Note: Room temperature is approximately 75° F day and night, and the humidity is approximately 30% to 40%

Refrigerator is 40° to 45° F with a relative humidity of 75% or higher

FLORICULTURE

UNIT 2

JOB SHEET #1 - Design a flower arrangement.

The purpose of this exercise is to acquaint the student with one kind and color of flower and how they are cut and placed in vase or bowl.

Given the following, each student or pair of students should produce an arrangement.

Vases - all alike - for one half of the class
Bowls - all alike - for one half of the class
Frogs (Flower Holder) - all the same - oasis, needle or other
Knife with straight blade
7 to 10 flowers, one kind and color

Note: Remember the first rule of proportion: the tallest flower should be 1½ to 2 times the height of vase or width of bowl, others proportionately shorter and extending beyond the rim of the vase or bowl.

FLORICULTURE
UNIT 2
TEST

1. Match the definition to the correct term:

_____ A. Arranging
_____ B. Complement
_____ C. Composition
_____ D. Delicate
_____ E. Distinctive
_____ F. Dominate
_____ G. Elements
_____ H. Florets
_____ I. Principles

1. One flower of many in a cluster
2. Different from other things
3. Small and fine
4. To be outstanding and superior
5. Arrangement into proper relationships
6. Something that completes or goes together with
7. Placing flowers so as to be pleasing to the eye
8. Basic rules, facts, or considerations
9. Basic parts of design

2. Define the nine principles of design:

A. Composition

B. Harmony

C. Focal Point

D. Balance

E. Proportion

F. Line

G. Texture

H. Rhythm

I. Color

TEST

3. List eight of the common geometric designs.

A.	E.
B.	F.
C.	G.
D.	H.

4. Define and list the use of the four flower forms.

A. Line	Use
B. Filler	Use
C. Mass	Use
D. Form	Use

5. a. When should flowers be cut?

   b. Why are stems not cut with scissors?

   c. Why crush woody stems?

   d. What is meant by the term 'hardening'?

   e. At what temperature range should flowers be stored?

6. List three types of container used by florists.

   A.
   B.
   C.

7. List two types of flower holders

   A.
   B.

8. List two reasons wire is used in flower arrangements.

   A.
   B.

9. List four mechanical aids used in flower arrangements.

A.	C.
B.	D.

LANDSCAPE NURSERY

UNIT 1

LANDSCAPING

TERMINAL OBJECTIVE

Upon completion of this unit, students will be able to define certain landscape terms, demonstrate the three general areas around the home for landscape development; identify the basic steps in developing a landscape plan or sketch; and draw a plan or make a sketch for presentation to a customer. The students will also be able to state facts about entrances, foundation plantings, service areas, and the outdoor living area of a landscape plan. This objective will be considered achieved upon attainment of a score of at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, students will be able to:

1. Define terms that pertain to landscaping.
2. List four basic steps in developing a landscape plan.
3. Identify true and false statements in developing a landscape plan.
4. List four considerations in selecting shrubs and trees for your home.
5. Give five mistakes made in landscaping planting.
6. Identify true and false statements about spacing plant material.
7. List two facts about entrance and four facts about corner plantings.
8. Name the three main areas to be developed in a home landscape plan.
9. Identify true and false statements about the public area.
10. Name three services found in the utility area.
11. List four features of the outdoor living area.

LANDSCAPE NURSERY

UNIT 1

INFORMATION SHEET

I. Terms and Definitions.

- A. Public Area - front yard area including foundation planting.
- B. Service Area - garage, work, and children play area.
- C. Outdoor Living Room - private rear area including patio, swimming pool and other landscape features.
- D. Landscape Design - the art of arranging and fitting together of lands, plants, landscape features, and buildings for human use and enjoyment.
- E. Landscape Development - How to combine the site, the plan, and the plants together.

II. Basic Steps in Developing a Landscape Plan.

- A. Drawing the plan.
- B. Design the yard area to complement the home
- C. Selecting the shrubs and trees
- D. Spacing and planting the shrubs and trees
- E. Maintaining the grounds

III. Drawing the Plan.

- A. Plans are an advantage because the landscaping may take several years to complete.
- B. Draw a site plan to scale using graph paper (scale 1 inch = 12 feet)
- C. Site plan will show location to scale of buildings, walls, drives, existing plant material and any other permanent features.
- D. This will show proper location of property lines and easements
- E. Doors, patio, garage, or carport windows will be shown to scale
- F. Indicate "N" point up or two your right on the plan
- G. Sketch by use of circles the location of shrub and lawn areas
- H. Select the right plants for the right locations

IV. Purposes of Shrubs and Trees.

- A. Add beauty
- B. Complement the home and not hide it
- C. Act as frames for homes
- D. Act as screens to hide umpleasant features or views

INFORMATION SHEET

V. Common Mistakes in Plantings.

A. Over planting - too many plants

B. Plantings too close to buildings, walks, drives, property line

C. Spacing plants too close together

D. Using plants not suited for the location

E. Using plants not hardy for our area

VI. Spacing and Planting of Shrubs.

A. Minimum spacing of center of plant to house is three feet.

B. Maybe 4' with houses with wide overhang.

C. Leave 3 to 5 feet between plants depending on whether they are broadleaf evergreens spreading or upright evergreens or flowering shrubs.

VII.a. Entrance Planting.

A. Emphasize the entrance (not hide it) and make it the feature point of the front of the home.

B. Use evergreens or broadleaf evergreens for year around affect.

b. Corner Planting

A. May be taller than entrance planting

B. May be low for ranch style homes

C. Should soften the corner by carrying the planting around the corner

D. For plantings to be in scale of the building the plantings should not grow over two-thirds the distance from the ground to the eaves.

VIII. Main Areas to be Developed in the Landscape Plan.

A. Public area - front

B. Private area - Outdoor living room

C. Service area - Garage area - side and back

IX. Public Area Development.

A. Make the lawn area open and spacious in proper proportion to the area available.

B. Include shade, ornamental, or specimen evergreens to compliment the home

C. Confine shrubs to foundation, borders, corners and property lines

D. Plantings may be balanced or informal depending on the architecture of the home or building.

E. Use those trees and shrubs which compliment the house to best advantage

INFORMATION SHEET

X. Service Area Development.

  A. Should be located in conjunction with the garage area

  B. Kitchen door should have access to area

  C. Should contain vegetable garden, clothesline, garbage containers, tool shed, cutting flower border, herb garden, children play are and compost piles.

  D. Children play area should be visible from the kitchen window

  E. Learn from your home owner the utilities you need to plan for

  NOTE: There are no blue prints or recipes for any particular treatment or situation. It is more a matter of each landscape designer using good design principles, sound judgment, and good taste to develop a property into a beautiful and useful space in which to live.

XI. Private Area Development.

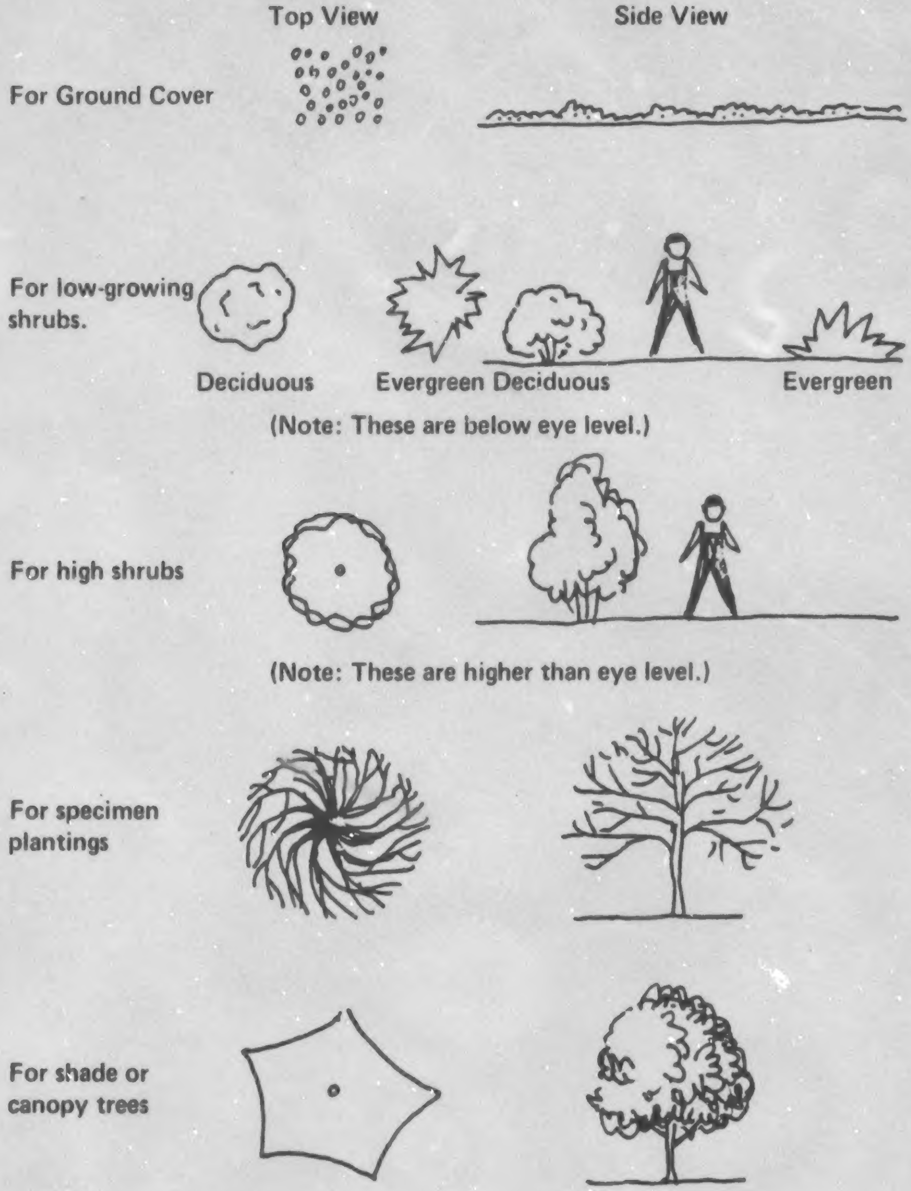
  A. Outdoor living area for the family.

  B. Includes such features as desks, patio, swimming pool, bird bath, barbeque pit, flower border, and specimen shrubs and trees

  C. Enclosed area for privacy

  D. Should include a terminal feature

Some Basic Landscape Plan Symbols


Top View
Side View
For Ground Cover
For low-growing shrubs.
Deciduous
Evergreen
Deciduous
Evergreen
For high shrubs
For specimen plantings
For shade or canopy trees

(Note: These are below eye level.)

(Note: These are higher than eye level.)

LANDSCAPE NURSERY

UNIT 1

ASSIGNMENT SHEET #1: Matching Quiz

1. Complete quiz and return to instructor.

A. Matching:

____1. Location of service area

____2. Should be visible from the kitchen window

____3. Included in the utility area

____4. Potential safety hazard area

____5. Possible shade tree for area

____6. Shrub to use for screening

____7. Direction to run clothesline

____8. Considered a part of the area

____9. Should be out of sight of public area

____10. Easily accesible from service area

a. Clothesline
b. Vegetable garden
c. Back door
d. Green ash
e. Front of house
f. Drive-way
g. Lombardy poplar
h. Side of house
i. Barn area
j. Children area
k. Garbage and trash
l. Honeysuckle
m. Rear of house
n. Vanhoutte Spirea
o. North and South
p. Adjacent to garage
q. Front door
r. Flowering dogwood
s. East and West

LANDSCAPE NURSERY

UNIT 1

ASSIGNMENT SHEET #2: Landscape the Public Area

Complete quiz and return to instructor.

A. Completion

1. The public area should primarily serve as a setting for ______________.
2. The public area should provide easy access to the ____________________.
3. Walks and drives should not be ____.
4. In landscaping before specifying plant material you should work with ___________________________ and ___________________________________.
5. The first plant material to locate in the public area are the ____.
6. An ____ is the most effective as a setting for the house.

B. Multiple Choice

1. The center of interest and balance point for all public area plantings is the:
   a. front lawn
   b. front entrance
   c. corner plantings
   d. picture window
2. A proper background for the house
   a. softens the silhoutte of the house against the sky
   b. makes the house look larger than it really is
   c. is to provide shade
   d. should always be evergreen
3. A house should be framed with trees
   a. for proper scale and proportion
   b. to make it look nice
   c. to make the home the focal point
   d. to provide shade

ASSIGNMENT SHEET #2: Landscape the Public Area

4. The tallest shrubs in the foundation planting should be placed
   a. at the corners or at the front entrance
   b. between the entrance and corners
   c. in front of the windows
   d. on either side of the entrance

5. The best overall foundation plantings should be
   a. Deciduous plants
   b. all evergreens
   c. evergreens and deciduous
   d. evergreens, broadleaf evergreens and deciduous shrubs

LANDSCAPE NURSERY

UNIT 1

ASSIGNMENT SHEET #3: Landscaping the Private Area

1. Take home and complete quiz and return to instructor.

A. True and False.

_____1. The living area is the most important area to the home owner.

_____2. The living area includes the front entrance of the home.

_____3. Focal points of interest are needed in an outdoor living room.

_____4. The type of fence or screening used around the area is entirely the owner's choice.

_____5. Evergreens vary in appearance and branching from one season to another while deciduous are constant all year.

_____6. The outdoor living room ties in with the family room of the home.

_____7. Outdoor living areas may be formal or informal.

B. Matching.

_____1. Size of lawn area needed for outdoor games

_____2. Rose beds should be located.

_____3. Only plantings in the lawn area should be

_____4. Flowering shrub suitable for border planting

_____5. Materials to avoid in the lawn area

a. in beds to themselves

b. in front of shrub border

c. 50 x 80

d. statues

e. 20 x 50

f. shade trees

g. Flowering shrubs

h. perennial garden

i. Forsythia

j. pampas grass

k. 80 x 120

C. Multiple Choice.

1. Patio should tie in with the
   - a. kitchen
   - b. family room
   - c. garage
   - d. bedroom

ASSIGNMENT SHEET #3: Landscaping the Private Area

2. Shape of the patio should be
    a. round
    b. square
    c. rectangular
    d. correspond to the shape of the private area
3. The terminal feature of your focal point should be
    a. flowering tree
    b. interesting statue on fountain
    c. broadleaf evergreens
    d. combination of the above three
4. Best plants to use for screen planting are
    a. Evergreens
    b. Deciduous
    c. Broadleaf evergreens
    d. combination of the above three

LANDSCAPE NURSERY

UNIT 1

ASSIGNMENT SHEET #4: Landscaping the Public Area of a Modern Ranch Type House

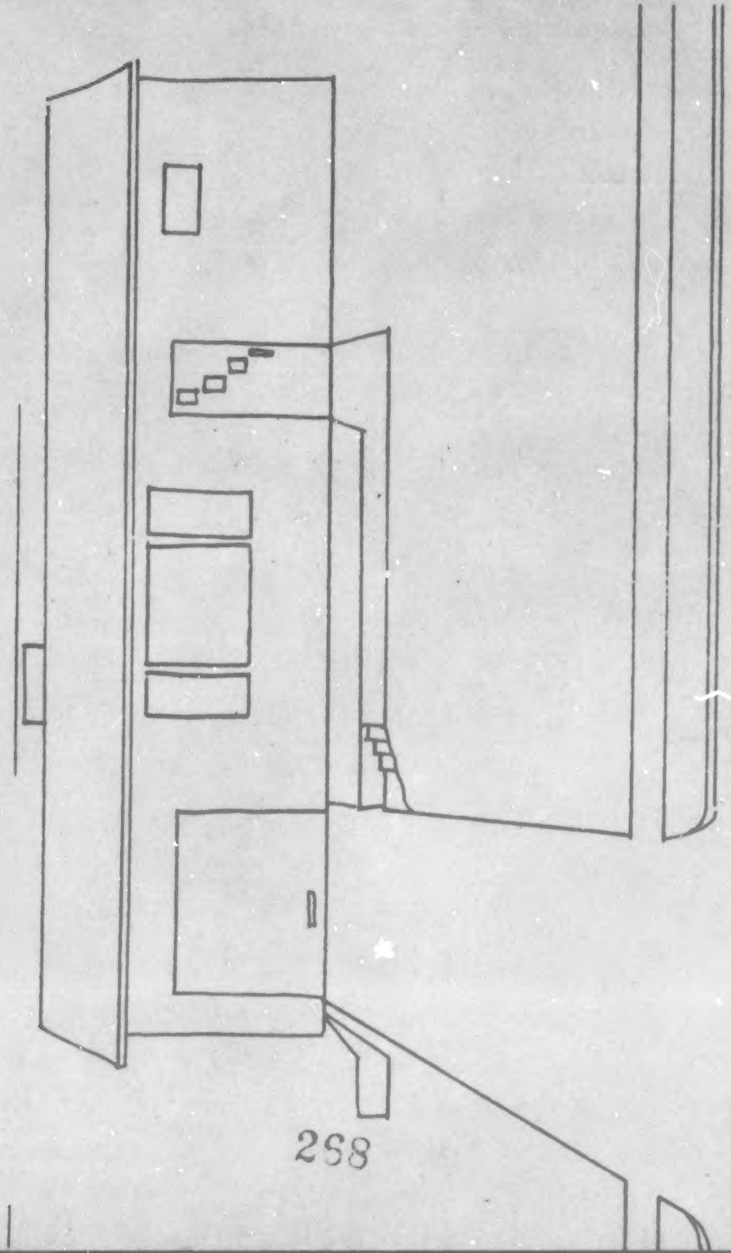
I. Do this plan twice - sketch once.

   A. First time - North or East Exposure

   B. Second time - South or West Exposure

   C. Third time - Do as a sketch rather than a plant

   List of correct plant material will vary to each section of the state.



LANDSCAPE NURSERY

UNIT 1

ASSIGNMENT SHEET #5: Selection of Appropriate Plant for Corner and Porch of a Two Story House

Follow same procedure as on Assignment Sheet #4.

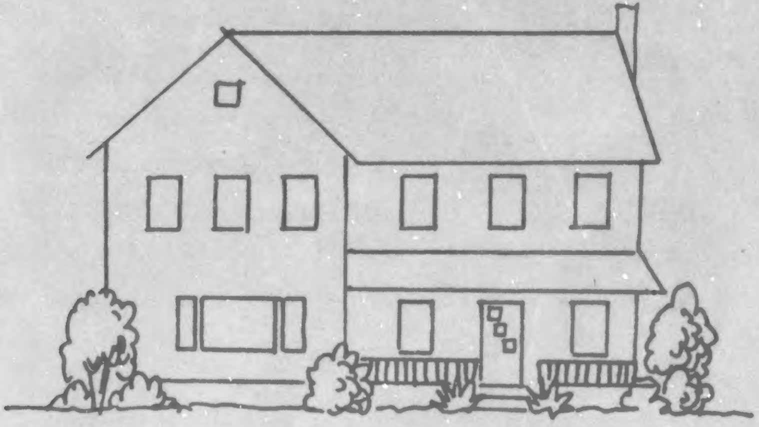
Suggest - Working up an estimate sheet for each house - showing:

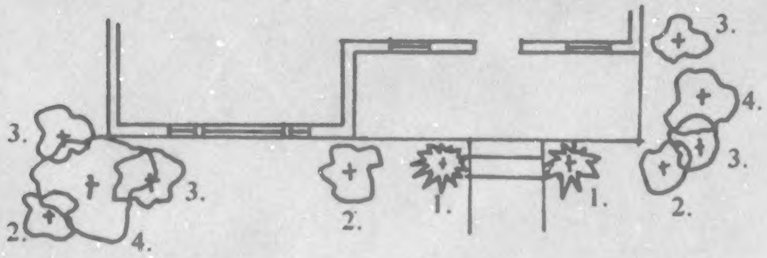
Cost of material (number of each plant by size)

Materials for planting (peat moss, fertilizer)

Labor

Total cost of installation





Suggested Planting

1. Compace Taxus Media (3')
2. Cranberry Cotoneaster (4')
3. Dwarf Spreading Yew (2')
4. Doublefile Biburnum (8'–10')

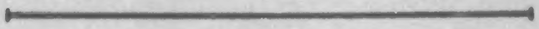
LANDSCAPE NURSERY

UNIT 1

ASSIGNMENT SHEET #6: Exercise Using a Scale.

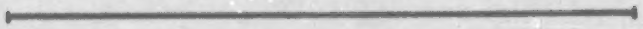
By using an engineers scale or ruler, complete the exercises as given:

I. Line A



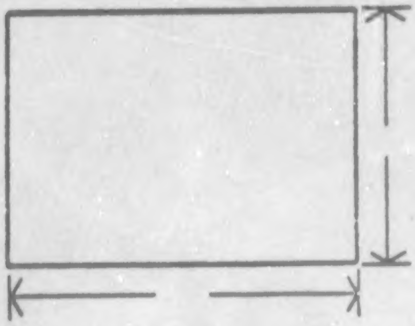
How long is Line A at 1" = 10'-0"
1" = 20'-0"

II. Line B

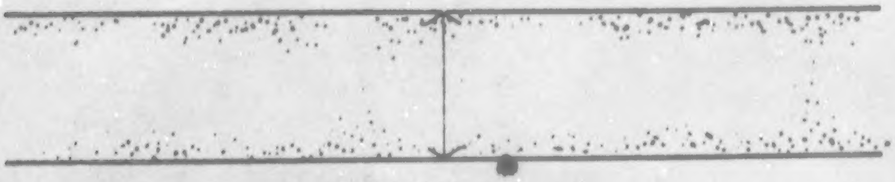


How long is Line B at 1" = 10'-0"
1" = 20'-0"

III. Below is a small building drawn at 1" = 10' - 0" - What are its dimensions, in feet?



IV. How wide is the road below at . . .1" = 10'-0"
. . .1" = 20'-0"
. . .1" = 40'-0"



LANDSCAPE NURSERY

UNIT 1

ASSIGNMENT SHEET #7: Suggested Drawing Equipment.

Required and optional drawing equipment items are as follows:

Required:

1 - Engineer's Scale
1 - 30° - 60° triangle or 45° triangle, 8" or larger
1 - French Curve, 6" or larger
1 - Art Gum Erasure
1 - Pink Pearl Erasure
1 - HB Drawing Pencil
1 - H Drawing Pencil
Tracing Paper or Vellum (100% Rag Content)

Optional:

1 - Circle Template

LANDSCAPE NURSERY

UNIT 1

TEST

1. Define the following terms.
    a. Landscape design
    b. Landscape development

2. List the four basic steps in developing a landscape plan.

3. Identify as True or False the following statement pertaining to drawing the plan.

_____a. Landscape plans should be completed the same year so all plants will be in scale.

_____b. The plantings should be pleasing in size, shape, texture, and color.

_____c. For ease in drawing use graph paper for your plan.

_____d. The site plan will show location of home and property lines.

_____e. Your plan will show the closest fire hydrant and street light.

_____f. North direction should always be to the left on your plan.

_____g. In using flowering shrubs and broadleaf evergreens, knowledge of sunny and shady locations must be noted.

_____h. Type and amount of fertilizer should be noted on plan.

_____i. The complete floor plan of the home should be on the plan.

_____j. All permanent features of the lot should be on the plan.

_____k. Walks and driveways need not be shown on plan.

_____l. Outside colors of the home should blend with the landscaping.

4. Name four points to consider when selecting shrubs and trees for the home landscape.

5. Give five common mistakes made in landscape plantings.

6. Identify as True or False the following statements pertaining to spacing plant material.

_____a. Spreading evergreens should be 3' from the foundation (center of hole).

_____b. Shade trees may be as close at 10' to the home.

_____c. Spacing of broadleaf evergreens may be closer than spreading evergreens.

_____d. Spreading evergreens on foundation plantings should be 5' apart.

TEST

7. a. State two facts about entrance plantings.

   b. List four facts about corner plantings.

8. Name the three main areas to be developed in a landscape plan.

9. Identify as True or False the following statements about developing the public area in the landscape plan.

_____a. Make lawn open and spacious in proper proportion to the area available.

_____b. Be sure the space you designate for planting is large enough for the shrubs specified.

_____c. Preparing the soil for lawn and shrubs is not necessary for planting.

_____d. Planting shrubs at random is better than in groups.

_____e. Shrubs do not need to be watered and fertilized when planted.

_____f. Trees selected should be in soil with the home when mature.

_____g. Foundation plantings should always be balanced or formal as compared to informal planting.

10. Name four items that the service area may contain.

11. The private area will center around the:

    a. Patio
    b. Bedroom area
    c. Kitchen door
    d. Children play area

LAWN MAINTENANCE

UNIT 1

COOL SEASON GRASSES

TERMINAL OBJECTIVE

Upon completion of this unit, students will be able to define turf grass terms, demonstrate the benefits of a good turf grass lawn, identify cool season grasses hardy for the area, and be able to perform tasks pertaining to the preparation of soil, seeding, fertilizing, watering, and mowing of a newly seeded lawn, and be able to correct problems relating to insects, diseases, and weeds. This objective will be considered achieved by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, students will be able to:

1. Match terms and definitions that pertain to growing cool season grasses.
2. List three benefits of grass as a ground cover.
3. List three zones that regulate the kind of grasses grown in Kansas.
4. Identify three kinds of cool season grasses and their characteristics which are grown in Kansas.
5. State the nine steps necessary in starting a lawn with cool season grasses.
6. List five factors affecting the proper maintenance of a lawn, identify three problems with cool season lawns, and demonstrate how the problems can be controlled.

LAWN MAINTENANCE

UNIT 1

INFORMATION SHEET

I. Terms and Definitions:

A. Cool Season Grass - Which stays green from early spring to late fall, best growing in 60° to 80° degree temperature.

B. Rhizome Root - Subterranean roots giving off adventurous roots.

C. Stolons - Runner type roots on the surface of the ground.

D. Overseeding - Reseeding an established lawn.

II. Grass as a ground cover for open areas:

A. Overall grass is the best of all-around ground covers because it can be:

1. Walked on
2. Played on
3. Trampled on
4. Stands up to rough use

III. Hardiness Zones for Turf Grasses:

A. Kansas is located in three zones:

1. Zone I - Northeast United States including Eastern Kansas
   a. Cool season grasses with sufficient rainfall.
2. Zone II - Southeast United States including Southeast Kansas
   a. Warm season grasses with sufficient rainfall.
3. Zone III - Northwest United States including Central & Western Kansas
   a. Cool season grasses with sufficient rainfall.

IV. Identification and Growth of Cool Season Grasses:

A. Kinds of Cool Season Grasses:

1. Blue Grasses
   a. Propagation by seed, plugs, or sod.
   b. Upright Habit, narrow blade and growing 8 to 9 months a year
   c. Many named varieties
   d. Grass becomes yellow when pH is above 7.0
2. Fescue
   a. Propagation by seed and takes July-August heat.
   b. Upright Habit, stolons above ground called tillers and growing 8 to 9 months a year.
   c. Kentucky 31 is the hardiest form with a wire blade.
   d. Has a tendency to clump when stand is not thick.

INFORMATION SHEET

3. Rye Grass
    a. Propagation by seed and does not hold up in hot weather.
    b. Used in a mix to hold soil until permanent grasses become established.
    c. Has a tendency to clump with stolons above ground.
4. Bent
    a. Propagation by seed or plugs
    b. Not recommended for home lawns

B. Germination under ideal conditions
1. Blue Grass - 10 to 14 days
2. Rye - 3 to 5 days
3. Fescue - 7 to 10 days

C. Seed Application and seed count
1. Blue Grass - 1 to 2 lbs per 1000 sq ft - new lawn
    1 lb per 1000 sq ft-overseeding
2. Fescue - 6 to 10 lb per 1000 sq ft - new lawn
    4 to 5 lb per 1000 sq ft - overseeding
3. Rye - same as fescue but use only in a mixture
4. Seed count per pound of seed
    a. Blue Grass-------2,250,000
    b. Fescue----------- 500,000
    c. Rye-------------- 275,000

D. Best time to seed
1. Fall-Late August to Mid-October- Best Sowing time
2. Warm days and cool nights
3. Preferred turf is blue grass or fescue
4. Use straight seed rather than a mix
5. Less weed problems
6. Less erosion on new lawn

E. Second best time to seed
1. Early Spring-as soon as the ground can be worked
2. Sow a mix rather than a straight variety of Blue Grass or Fescue
3. More problems with weeds
4. Needs to be established before hot weather arrives

F. Soil pH for cool season grasses
1. All will thrive in 6.0 to 7.0 range
2. Above 7.0 Blue Grass & Fescue will show Iron Deficiency

INFORMATION SHEET

V. Establishing a new cool season lawn:

   A. Removal of debris such as rock, construction materials, tree roots and brush.

      1. Should be hauled off rather than buried

   B. Grading the subsoil

      1. Graded properly to drain
      2. Check for slopes too steep for mowing
      3. Proper grades will carry water away from house
      4. Do not change grade more than a few inches around existing shade trees, either cut or fill.

   C. Application of topsoil & completing the finished grade.

      1. Same grade as the subsoil grade
      2. Sufficient topsoil to grow trees, shrubs and lawn-minimum 2 inches
      3. Check the soil for nutrients
      4. Minimum grade-1 to 60
      5. Maximum grade-1 to 15
      6. Check for need of retaining walls or terraces

   D. Preparation of soil for seeding

      1. Discing or tilling of soil to 2 inches deep.
      2. Do not pulverize the soil
      3. Largest soil particle should be ½ inch in size

   E. Application of seed

      1. By hand is not satisfactory
         a. Not applied uniformly
         b. Takes more seed
      2. Use of a Cyclone seeder
         a. Walking or on wheels pulled by tractor
      3. Large areas-seed is drilled by brillion seeder
      4. Should be applied from two different directions as it gives better coverage.

   F. Fertilizer applied the same day

      1. Light weight fertilizer is applied with drop type spreader
      2. Pellet type fertilizer is applied with a cyclone type spreader
      3. Fertilizer should be a non-burning ureaform nitrogen

   G. Covering the Seed

      1. Garden rake is used for small areas - by hand
      2. Large areas, use a weighted down piece of fence wire pulled behind tractor.

INFORMATION SHEET

        a. Covers the seed and levels out high and low areas.

    3. Seed should not be covered over ½".

H. Rolling the seeded area

    1. Firms the soil around the seed which gives quicker germination

    2. Lessens the chances of erosion.

    3. This operation is optional and is not always done.

I. Watering of the seeded area

    1. Keep soil moist but not wet until germination

    2. Watering one, two or three times a day depending on how quickly the soil drys, due to temperature, sun and wind.

    3. Do not water over 20 minutes in a location

    4. Overwatering may cause rivelets to form and soil starts to erode.

J. Germination of seed

    1. New growth will appear in 3 to 14 days depending on kind of seed sowed.

    2. Water new growth two to three times a week depending how quickly the soil drys.

    3. After two weeks watering will be on a once a week basis.

K. Mowing your new lawn

    1. Four weeks after germination cut grass at 2½" to 3" height

    2. Permits grass to thicken or 'Stool out'.

VI. Maintaining an established cool season grass lawn:

A. Mowing

    1. First mowing in spring cut the grass to 1½" to remove dead grass.

    2. Thatch build-up is primarily from dead grass over winter.

    3. In the spring and fall blue grass and fescue may be cut at 2" in height

    4. The mower blades should be set at 2½" to 3" during the hot part of the summer-July and August.

    5. Fescue can be cut shorter than blue grass during this period.

    6. Do not remove more than 1/3 of the blade surface when mowing.

    7. Mow every 5 to 7 days in the spring and fall depending on the growth of grass.

    8. During the summer when growth is not as vigorous mow every 7 to 10 days.

    9. Do I mow with a reel or rotary mower?

        a. More uniform cut with a reel type

        b. Reel type makes a cleaner cut-less damage to the blade

INFORMATION SHEET

c. Rotary type is less expensive to purchase and easier to sharpen.

B. Fertilizing

1. For best results, use a ureaform nitrogen fertilizer for it is non-burning and feeds over a longer period of time.
2. First application in March or first of April, use a Balanced fertilizer and a pre-emergence Crab grass control.
3. Second application in May includes a Balanced fertilizer plus a broad leaf weed control.
4. Third application is a Balanced fertilizer applied the first of September.
5. If only two applications are applied during the year then apply only one in the Spring.
    a. If narrow leaf grasses or broad leaf weeds become a problem they can be controlled by spraying-liquid or dry application
6. Do not fertilize in mid-summer as the new grass is weak and subject to disease.

(Note: The dates may vary a week or two depending on location in Kansas)

C. Watering

1. Grass requires one inch of moisture a week.
2. Overhead sprinkler puts out approximately one inch of moisture per hour.
3. Methods of application
    a. By hand-not satisfactory and very uneven
    b. Movable overhead sprinkles-some areas may not get watered.
    c. Underground sprinkler system-most uniform, less wasted water but most expensive.
4. Best time of day or night to water.
    a. Early morning hours are best times to water
        1. Uniform coverage-No wind to contend with
        2. Requires less water as evaporation is not as great
        3. Moisture is not long on blades or Crown which lessens the opportunity for fungus to become active.
    b. Early evening water leaves moisture overnight on the foliage and a greater chance for fungus.
    c. Do not water in the heat of the day in mid-summer as this will 'cook' the foliage.
5. Overwatering in mid-summer when grass is partially dormant will induce weeds to Grow-Like Grab grass.

D. Disease and Insect Problems and Control

INFORMATION SHEET

1. Fungus problems are the most common diseases found in the lawn
2. Fungus is active when moisture content or humidity is high, days are cloudy or overcast, air movement is low, the area is shady and the temperature is right.
3. Not all fungi are active at the same temperature.
4. Some common fungus problems in the lawn
    a. Leaf spot-damage to blue grass and fescue. Spot appears on foliage extending across the width of the blade. Attacks in Spring and Fall in cool moist weather, likes lush growth from excess fertilizing.

    b. Snowmold-appears in early spring in 30° - 40° - lush growth going into winter, mats down from snow and ice, grayish circular areas appears in February and March.

    c. Brown patch-appears in the hot part of the summer, grass is soft due to excess nitrogen. Does damage to blue grass.

    d. Dollar spot-very small round spots appear in Blue Grass when humidity is high and temperature is moderate, mainly spring and fall. Kills both leaves and stems. Most damage done to grass lacking nitrogen or one over fed with nitrogen.
5. Insect Problems in cool season grasses
    a. Sodweb Worm-larva stage feeding on the crown and foliage Blue grass ½ to 3/4 inches long. Adult is small light brown moth flying low over larves in the evenings and dropping eggs.

    b. White Grubs-larva stage of the brown beatle. Insect 1-1½ inches in length with brown head. Does damage by chewing and feeding on grass roots. Heavy concentration of grubs will damage blue grass and fescue lawns-more than 4 per sq ft of sod.

(NOTE: With new products coming on the market and others going off, it is impossible to recommend controls. Suggest you check with your county agent or local garden store for your best controls.)

E. Common Weeds in your lawn

1. Two types of weeds are common to the lawn
    a. Broad-Leaf Weeds--Dicots
    b. Narrow or grass like leaf weeds--Monocot
    c. Require different controls
    d. Best control for weeds is a healthy stand of grass
2. Common Grass-Like Weed
    a. Crab Grass-summer annual from seed each year. May be smooth or hairy. Germination begins in early May.

    b. Fox-tail-summer annual from seed. Looks like crab grass but has a foxtail like seed head. More upright growth.

INFORMATION SHEET

   c. Goose grass - summer annual. Prostrate grower-center of plant looks like spokes of a wheel. Almost white in color. Harder to control than crab grass.

   d. Nut grass or serge - upright and grass-like in growth. Narrow yellowish blades, forms nuts on the roots as well as corn-like seeds. Grows best in damp shady locations and hard to control.

3. Common broad leaf weeds

   a. Dandelions - perennial Rosette type weed with yellow flowers, seeds maturing three weeks after flowering.

   b. Knotweed - annual prostrate grower, very small leaves, thriving in poor compacted soil and hot locations.

   c. Plantain - narrow upright seed stock, broadleaf weed, rosette-like perennial, heavy fibrous root system and appears where lawn is shady.

   d. Chickweed - common winter annual, smooth leaf - grows best in cool, damp, and shady locations and likes heavy soil.

   e. Curly dock - upright perennial to 4" high, long norrow pointed leaves, tap root, with brown seed head in the last of summer.

LAWN MAINTENANCE

UNIT 1

ASSIGNMENT SHEET #1: Importance of Well Maintained Lawn Area

1. Do the following:

   A. List the possible values relating the importance of a well-kept lawn.

   B. Write an expression of your values relating to a well-kept lawn.

   C. Select a home nearby and figure the amount of seed and fertilizer required to plant the lawn area.

   D. Estimate the number of man hours required to do the job from the tilling through the watering until germination for the home above.

LAWN MAINTENANCE

UNIT 1

ASSIGNMENT SHEET #2: Soil Conditions Needed For Healthy Grass

1. Do the following:

   A. Describe the soil conditions needed for healthy grass by using the following topics:

      1. Soil profile, texture, structure, and aeration
      2. Soil reaction and the availability of nutrients
      3. Organic materials for soil improvements

   B. Prepare a written report of the specific tasks listed above as they apply to soil management in general.

   C. Collect soil samples from five lawns and compare texture, structure, and aeration.

   D. List different locations in a lawn where soil samples should be taken and the depth taken.

LAWN MAINTENANCE

UNIT 1

ASSIGNMENT SHEET #3: How Does Your Lawn Rate?

EACH QUESTION COUNTS 5 POINTS	YOUR SCORE
1. Is the lawn well kept?	________
2. Is the lawn weedless?	________
3. Is the lawn mowed regularly as needed?	________
4. Is the lawn free from gophers or moles?	________
5. Is the grass along the walks and drives maintained properly?	________
6. Are there tire marks in your lawn?	________
7. Do you have bare spots in your lawn?	________
8. Is the lawn difficult to mow because old shrubs, flower beds, rose bushes, trellis and fruit trees are located in it?	________
9. Do you have heavy shade where grass does not grow?	________
10. Does grass grow in beds where it shouldn't?	________
11. Is there sufficient grass around the house to give it a good setting?	________
12. Are there objects in the yard that should not be there?	________
13. Has the grass been properly maintained near the home or in hard to get places in your lawn?	________
14. Has grass been allowed to grow in cracks of your walks or drives?	________
15. Are you growing the proper grass for sun or shade locations?	________
16. Does your home look inviting due to a good stand of grass?	________
17. Does your lawn look weak due to lack of fertilizer?	________
18. Are you proud of your lawn to show it off to friends?	________
19. Have you taken a special interest in your lawn and want it to look better?	________
YOUR SCORE	________

LAWN MAINTENANCE
UNIT 1
TEST

1. Match terms:

_____a. Cool season grass
_____b. Rhizome roots
_____c. Overseeding
_____d. Stolon roots

1. Surface roots
2. Seeding over an established lawn
3. Grasses that grow best in 60° to 70° temperature
4. Deep roots

2. List three benefits of using grass as a ground cover.

3. Name three hardiness zones that affect Kansas and the type of grass that grows in each.

4 A. Identify as True or False the following statements describing cool season grasses for Kansas.

_____1. Blue grass may be grown from seed, plugs, or sod.
_____2. Bent grass, because it requires constant care, is not practical for home use.
_____3. Kentucky 31 is a type of Blue grass.
_____4. Rye grass is used primarily as a temporary grass due to hot weather in July and August.
_____5. Fescue germinates quicker that Blue grass.
_____6. Fescue has a tendency to clump when the stand is not thick.
_____7. Blue grass seed is larger than fescue seed.

4 B. List four fact that confirm early fall as the best time to seed.

5 A. Name four steps prior to seeding in preparation of the soil.

5 B. Starting with seeding, state four additional steps to do prior to germination.

5 C. Choose from the following statements those that pertain to starting a new lawn from seed.

_____1. Blue grass and Fescue have the same seed count per pound.
_____2. Minimum slope for a lawn should not be more than 1 to 60.

TEST

______3. No problems appear later if wood and old tree roots are buried in the lawn.

______4. Grass seed should not be covered more that 1/2 inch.

______5. Existing shade trees may die if the grade is changed too much around them.

______6. Tilling the soil for seeding is best when the depth is not over 2 inches.

______7. Soil for seeding should be pulverized.

______8. Type of applicator to spread fertilizer depends on the weight of the fertilizer.

______9. It is very easy to over water newly seeded areas.

6 A. List three basic areas that affect the proper care of grass.

6 B. Identify as True or False the following statements describing proper care of a lawn:

______1. Thatch is primarily dead roots and stems.

______2. The higher the temperature the higher you mow cool season grasses.

______3. Blue grass may be mowed closer that Fescue in the summer.

______4. The most you remove when you mow is 1/3 of the blade.

______5. Rotary type mower cuts more uniformly than the reel type.

______6. Lawns are mowed the same height year around.

______7. Ureaform nitrogen is a fast acting nitrogen.

______8. Lawns should not be fertilized in the hot part of the summer.

______9. Overwatering Blue grass is July and August will encourage Crab grass to grow.

______10. Watering may be done anytime of the day or night with equal results.

6 C. Matching lawn weeds:

______1. Crab grass

______2. Dandelion

______3. Foxtail

______4. Plantain

______5. Goose grass

______6. Knotweed

______7. Nutgrass - sedge

______8. Chickweed

1. Broadleaf, Annual
2. Broadleaf, Perennial
3. Grass-like, Annual
4. Grass-like, Perennial

VEGETABLE PRODUCTION

UNIT 1

VEGETABLE PRODUCTION

TERMINAL OBJECTIVE

Upon completion of this unit, students will be able to define terms pertaining to vegetable production, differentiate between fruits and vegetables, name vegetables grown for their different parts, explain the different types of vegetable production, recognize why home gardening is popular, list the purposes of different vegetable growing structures, identify the why and how's of hardening off, prepare a satisfactory seed bed, and plant a garden. This objective will be considered achieved upon successful performance of the job assigned and attainment of a score of at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, students will be able to:

1. Match terms pertaining to vegetable production.
2. Differentiate between plants that are vegetable crops and plants that are fruit crops.
3. Name vegetables raised for their leaves, flower parts and stems, underground parts, and fruits or seeds.
4. Explain the four various types of vegetable production.
5. Recognize five reasons why home gardening popular and in recent years has been on the increase.
6. Indicate the purposes of two vegetable growing structures.
7. Explain why and three how's of hardening off is done.
8. Prepare a satisfactory seed bed and plant a garden to the satisfaction of the instructor.

VEGETABLE PRODUCTION

UNIT 1

INFORMATION SHEET

I. Terms and Definitions.

  A. Olericulture or vegeculture - The art and practice of growing vegetable crops.

  B. Annual - A plant that completes its life cycle in one year

  C. Perennial - A plant that has a life cycle of more than two years.

  D. Fruit Structure - The enlarged ovary usually encasing the seed.

  E. Hardening Off - A process which gradually toughens a greenhouse grown plant in order to lessen the shock of transplanting.

II. How to Differentiate Between a Vegetable Crop and a Fruit Crop.

  A. Vegetable Crop.

    1. All vegetable crops are annuals except Rhubarb and Asparagus.

    2. Vegetable crops are generally more bland tasting and usually eaten in the main part of the meal.

    3. Some vegetable crops have Fruit Structures, i.e., tomatoes, peppers, watermelons.

  B. Fruit Crop.

    1. All fruit crops are perennial.

    2. In order to be a fruit crop it must have a fruit structure.

    3. Fruits are generally sweet tasting and usually eaten for desserts or snacks.

III. Vegetables Raised for Their Different Parts.

  A. Vegetables raised for their leaf structures.

    1. Lettuce
    2. Cabbage
    3. Kale
    4. Spinach

  B. Vegetables raised for their flower parts and stems.

    1. Broccoli
    2. Cauliflower
    3. Asparagus

  C. Those raised for their underground structures.

    1. Irish Potatoes
    2. Sweet Potatoes
    3. Beets
    4. Onions

INFORMATION SHEET

5. Carrots
6. Radish

D. Those raised for their fruit or seed.

1. Tomato
2. Pepper
3. Watermelon
4. Beans
5. Peas
6. Sweet Corn

IV. Types of Vegetable Production.

A. Home gardening - Work done by the family and produce consumed by the family - perhaps some giving or trading with friends and relatives.

B. Market Gardening - This terms refers to growing vegetables and selling them on a retail basis.

C. Truck Gardening - Usually done on a larger scale with hired help and the produce is sold on a wholesale basis.

D. Vegetable Seed Production - This is a vital part of the vegetable industry. Vegetable seeds are raised mainly on the West Coast.

V. Reasons Why Home Gardening is Popular and Increasing.

A. Men, women, and children have always had a basic, innate desire to work with the soil.

B. Usually home grown vegetables are of better quality and freshness than store bought. This is the "you know what you are getting" concept.

C. Recent inflation of food prices has made home gardening a bigger saver than ever before.

D. Gardening serves as a wonderful therapy for the busy persons of today's "rat race society".

E. There is a great satisfaction in having done, accomplished or grown something "by yourself". This especially applies to youngsters.

VI. Special Growing Structures for Vegetables and Their Purposes.

A. Hot Beds - Are used to start seeds which will later be transplanted.

B. A cold frame is a structure used to help hardening-off vegetables before transplanting.

VII. The Whys and Hows of Hardening-Off.

A. Hardening-off is necessary to toughen or make the plant tissues harden. Realize that a transplant has been growing in a greenhouse or hotbed at a very rapid rate because of optimum amounts of water

INFORMATION SHEET

fertilizer, and temperature. When a plant is growing rapidly all the tissues and cells are soft-ready for rapid growth. If this "soft" plant were planted outside the "shock" of lower temperature, less water and fertilizer would be detrimental.

B. The how of hardening-off is quite simple. It is a gradual process starting about two weeks before transplanting time of slowly reducing the amount of water, temperature, and fertilizer.

VIII. Principles of Garden Seed Bed Preparation and Planting.

A. If at all possible, plow garden in the fall of the year incorporating generous amounts of organic matter, i.e., leaves, grass clippings, manure, etc. Also add one pound of N per one thousand square feet. This will give a loose, mellow soil to work with in the spring of the year.

B. When planting time actually comes, the soil should be worked with a rake, hoe or roto tiller. A general rule of thumb is the smaller the seed the finer the seed bed should be prepared. The seed bed doesn't have to be in a completely pulverized condition; there is nothing wrong with a few small clods.

C. Don't work the soil when it's too wet.

VEGETABLE PRODUCTION

UNIT 1

ASSIGNMENT SHEET #1: Plan and Diagram a Home Garden.

I. Do the Following:

A. On a 8½ x 11 sheet of typing paper draw a rectangle that would represent a garden 50' x 100'. A good scale would be 1 inch on your paper equals 10 feet in real life.

B. Your rows of vegetables can run either way and each row should be represented by a fine line with a number at the end of each row. Be sure to get the spacing between the rows correct to scale.

C. Use at least 10 different vegetables.

D. Use the following principles to arrange the vegetable rows:

1. Perennials and vine crops should be planted around the borders (except the North)

2. Plant the tallest vegetables on the north border to prevent them from blocking sun from others.

E. On a separate sheet of lined paper use a chart to record the following information:

Row #, Kind of vegetable, variety of vegetable, spacing between the rows, spacing in the row, days to harvest, yield per row.

VEGETABLE PRODUCTION

UNIT 1

JOB SHEET #1: Prepare a Seed Bed.

I. Materials Needed:

- A. Plot of ground at least 10' x 20':
    - 1. sunny
    - 2. level
    - 3. away from trees
- B. Tilling tools:
    - 1. Moldboard plow
    - 2. roto-tiller
    - 3. spade or fork
- C. A good supply or organic matter
- D. Lime and fertilizer
- E. Garden rake and hoe.

II. Procedure:

- A. Preferably in the fall of the year, apply the organic matter.
- B. Incorporate it into the soil when plowing, tilling or spading.
- C. In early spring apply lime and fertilizer according to soil test recommendations.
- D At planting time, smooth the soil surface with rake or hoe or roto-tiller.

  CAUTION: The seed bed should not be in a pulverized condition but rather a few small clods should exist.

VEGETABLE PRODUCTION
UNIT 1
TEST

1. Match:

_____a. Olericulture

_____b. Annual

_____c. Perennial

_____d. Fruit structure

_____e. Hardening-off

1. A toughening process for plants
2. The enlarged ovary usually encasing the seed
3. Having a life cycle or more than two years.
4. Completes its life cycle in one year
5. Art & practice of growing vegetable crops.

2. List two ways in which vegetable crops are different than fruit crops.

	vegetable crops	fruit crops
a.		
b.		

3. Name three vegetables grown for each of the following parts:

   a. leaves

   b. flower parts and stems

   c. underground parts

   d. fruits or seeds

4. Give a brief statement describing each of the four types of vegetable production.

   a. home gardening

   b. market gardening

   c. truck gardening

   d. seed production

5. Give five reasons why home gardening is popular and on the increase.

6. List a main purpose of the following vegetable growing structures.

   a. hot bed

   b. cold frame

TEST

7. Give a brief statement why hardening off is necessary and three ways it is done.

Why:

How:

a.

b.

c.

FRUIT PRODUCTION

UNIT 1

FRUIT PRODUCTION

TERMINAL OBJECTIVE

Upon completion of this unit, students will define terminology pertaining to fruit production, list different varieties of apple and peach trees, state the factors to consider in the timing of pest control, list the factors in considering a fruit variety, match pesticides with their uses, perform general training and pruning of fruit trees on diagrams. This objective will be considered achieved by scoring at least eighty-five percent on the test and completing the assignment sheet to the satisfaction of the instructor.

SPECIFIC OBJECTIVES

After completion of this unit, students will be able to:

1. Define terms that relate to fruit tree production.
2. List three different varieties of apples and three different varieties of peaches recommended for Kansas.
3. List four factors to consider in the timing of pest control.
4. State four factors to consider in choosing varieties of fruit.
5. Match six pesticides with their uses.
6. Perform general training and pruning of fruit trees on diagrams. (Job Sheet #1)

FRUIT PRODUCTION

UNIT 1

INFORMATION SHEET

I. Terms and Definitions.

  A. Pome fruits - fruit with an embedded core

    1. Malus - Apple

    2. Pyrus - Pear

  B. Drupe fruits - stone seeded fruit. Seed is incased in a hard shell, inside fleshy tissue.

    1. Prunus - Peach
       - Plum
       - Apricot
       - Cherry

  C. Nut fruit - shell around seeds.

    1. Carya - Pecans

  D. Rootstock - the term applied to that part of a tree which makes up the root system of a grafted or budded tree.

    1. Seedling - of domestic cultivars

    2. Clone - a horticulture terms used to denote a specific cultivar that has been propagated asexually or vegetatively.

    3. East malling - clonal rootstock with numbers as: EMVIII, EMIX, EM26, EMVII, EMII, EMI EMXIII, EMXVI.

    4. Malling - Merton; clonal rootstock with numbers as: MM106, MM104, MM111, MM109.

    5. Angers Quince - clonal rootstock, EM type A

    6. Mahaleb

    7. Mazzard

    8. Myrobalan

  E. Scion - denotes a short piece of twig or only a bud with attached section of bark which is inserted into the rootstock.

  F. Graftage - term applied to the methods of inserting a section of one plant, the scion, into another, the stock. A grafted tree consists of at least two parts, the root system of the stock and the scion cultivar or top.

    1. Whip-Grafting

    2. T-Budding

    3. Patch-Bud

  G. Fruit spurs - Stubby fruit-bearing twigs up to three inches long.

  H. Twig - A very small branch of a tree

INFORMATION SHEET

- I. Fruiting wood - the part of a branch that produces the fruit.
- J. Lateral - branches that are horizontal to the ground.
- K. Crotch - where two branches come together to form a "Y".
- L. Headed back - terminal portion of twigs, canes or shoots are removed.
- M. Thinned out - entire twig, can or shoot is removed.

II. Apple and Peach Varieties Recommended for Kansas.

- A. Apples
  1. Lodi
  2. Jonathan
  3. Golden Delicious
  4. Delicious
  5. Winesap
- B. Peaches
  1. Early: Redhaven, Ranger
  2. Mid-season: Halehaven, Cresthaven, Champion
  3. Late season: Redskin

III. Factors to Consider in Controlling Fruit Pests.

- A. Some disease problems begin during the bloom period; other diseases develop later in the season.
- B. During a single growing season there may be two or more broods of various insects.
- C. As branches, leaves, and fruit grow, new tissue is exposed and should be protected from injury caused by disease organisms and insects.
- D. Rainy weather may provide conditions suitable for spread of diseases and may wash protective chemicals from plant parts.
- E. To be effective, protective chemicals must be thoroughly distributed over fruit and foliage.
- F. Fruit plant requires care in addition to protection by chemicals to be vigorous and productive. Pruning, fertilizing, and weed control are important in maintaining vigorous plants.

IV. Factors to Consider in Choosing Varieties.

- A. Personal preference
- B. Ripening time
- C. Space requirement
- D. Hardiness and adaptability
- E. Use of fruit

INFORMATION SHEET

V. Pesticides and Their Uses.

A. Dormant Oil Spray - effective against scale insects and red mite eggs.

B. Kelthane - used for mite control. Mite population often builds up rapidly in warm weather.

C. Malathion - a comparatively safe phosphate insecticide effective against sucking insects (aphids, plant bugs, leafhoppers).

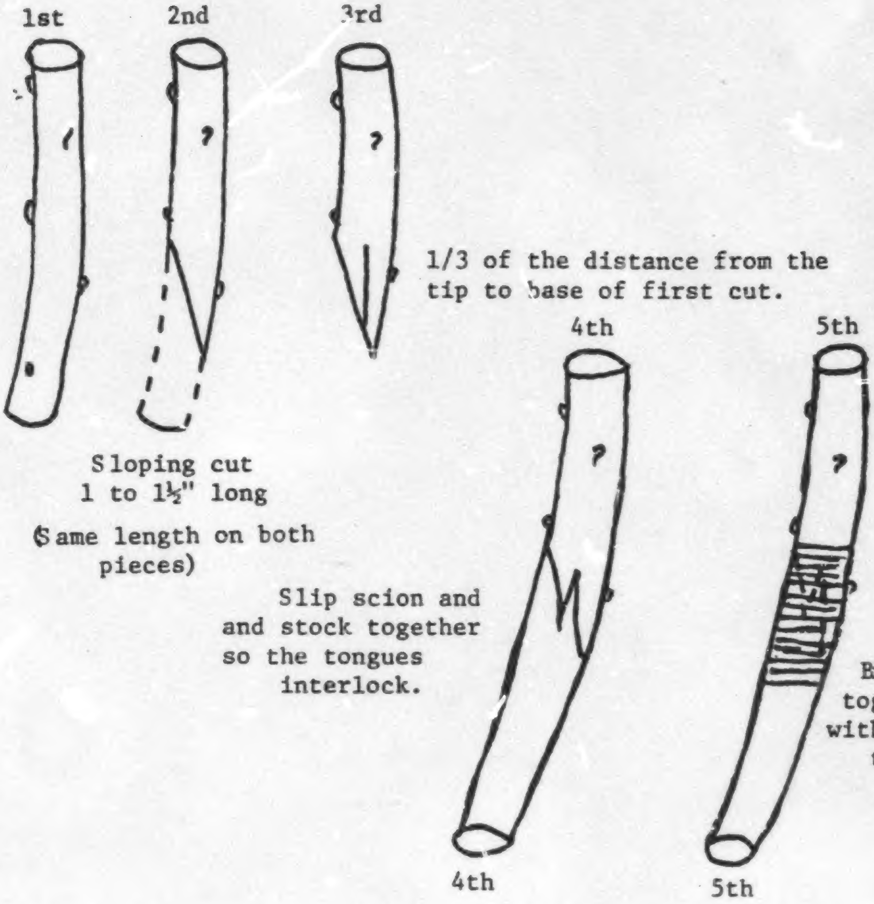
D. Methoxychlor - used to control codling moth, oriental fruit moth, curculio and many fruit deforming insects.

E. Sevin - similar in action to Methoxychlor. It is not suggested for use on apples before the first of June because earlier use may cause fruit drop on apple trees. Use of sevin may result in build-up of mite populations.

F. Thiodan - Used to control peach borers.

WHIP-GRAFT

SCION


1st
2nd
3rd
4th
5th
4th
5th

Sloping cut
1 to 1½" long

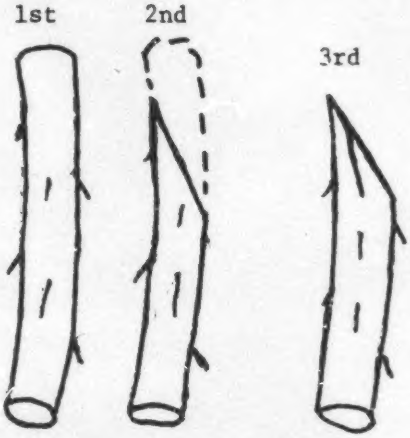
(Same length on both
pieces)

1/3 of the distance from the
tip to base of first cut.

Slip scion and
and stock together
so the tongues
interlock.

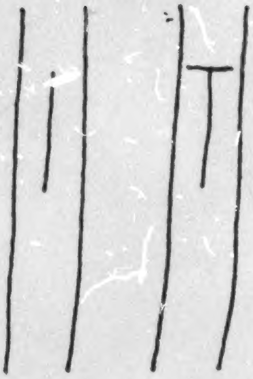
Bind
together
with grafting
tape.

STOCK



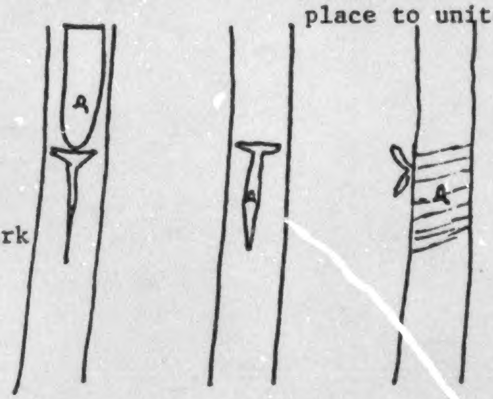
1/3 of the distance from
the tip to base of first cut.

T-BUDDING



A vertical cut about 1" long

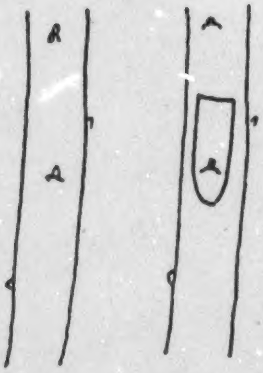
A horizontal cut, about 1/3 the distance around the stock.



A budding rubber strip holds the bud and bark in place to unite.

Insert wood by pushing it downward under the flaps of bark

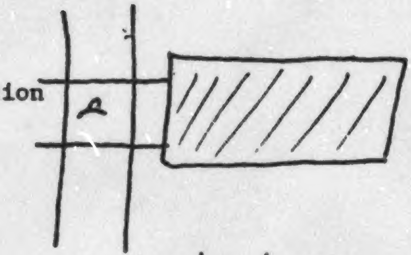
Insert bud until cuts on the bud and stock are even.



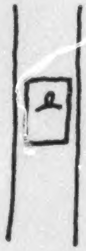
Start about ½" below the bud; slice under bud and up about 1" beyond the bud.

PATCH BUD

Bud from Scion

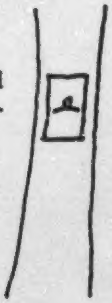


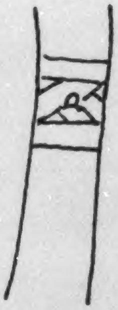
Two horizontal cuts with bud in middle.



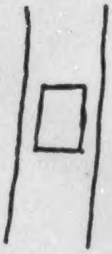
Two horizontal cuts connected by two vertical cuts the same width used on rootstock below.

Insert bud patch in rootstock.



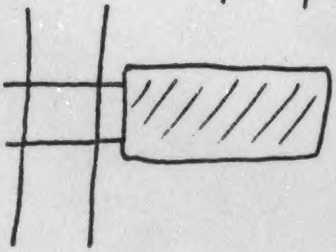


Union is wrapped with a plastic tie. 8" long and can stretch.



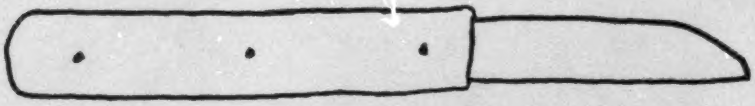
Two horizontal cuts are connected by two vertical cuts and the patch removed.

STOCK

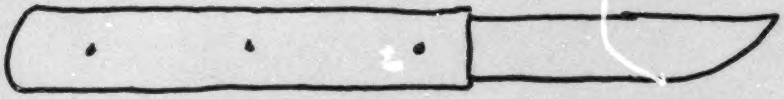


A double-bladed knife, cut 1/3 of distance around the stock.

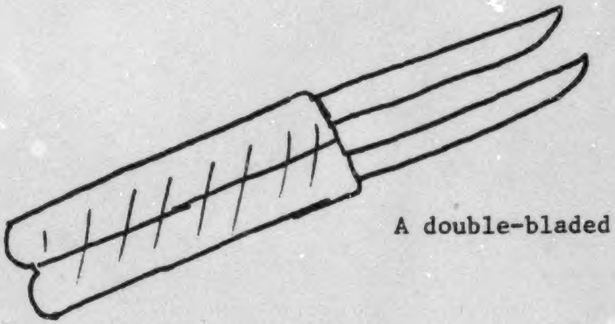
TOOLS FOR GRAFTING


cutting edge

GRAFTING KNIFE

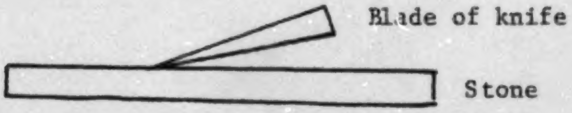

cutting edge

BUDDING KNIFE

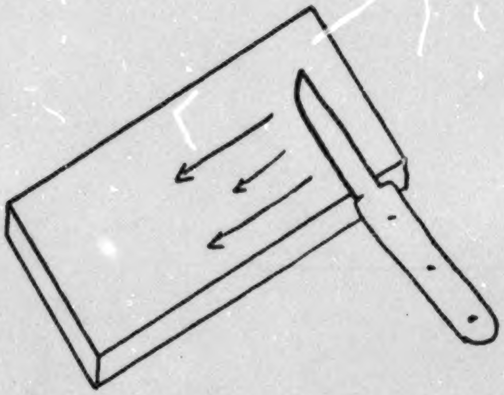


A double-bladed knife

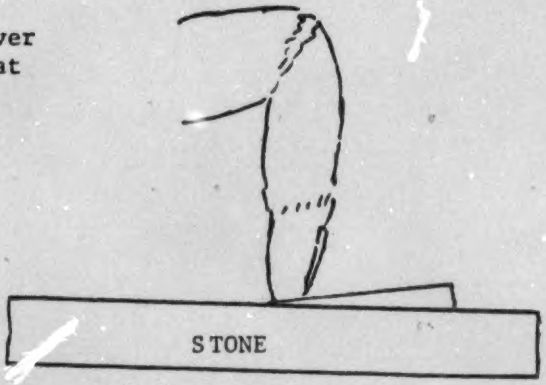
KNIVES AND HOW TO SHARPEN PROPERLY



The sides of the blade should be flat from edge to back of blade.

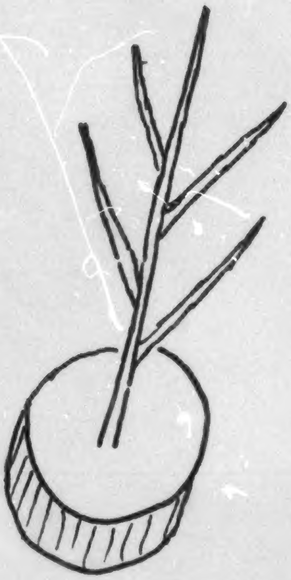


Hold blade of knife flat on stone and pull blade so that the stone cuts the metal from front edge to back only. Turn blade over and hold blade flat on stone and push so that the stone cuts the blade from edge to back.

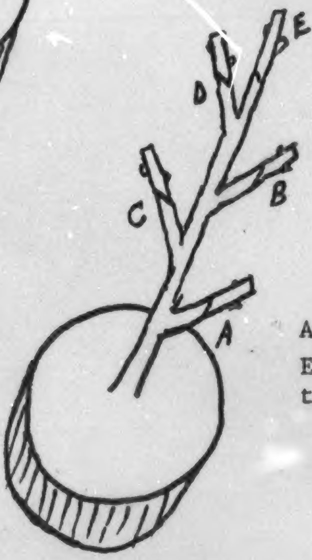


Finger tip holds the edge of blade flat to the surface of the stone, push or pull.

COMBINATION APPLE TREE



9/16 - 11/16" graded furit tree. 4 to 5 branches planted in a five gallon can. (Yellow Delicious, best to use) (Dorment apple tree)



Whip-graft as on TM 1

A, B, C, D are different varieties.

E is the top of the Yellow Delicious tree cut back.

Let one or two buds from each variety grow to form the top of your apple tree.

FRUIT PRODUCTION

UNIT 1

ASSIGNMENT SHEET #1: Plotting Fruit Trees.

I. Do the Following:

A. Draw a one acre of land to scale on a sheet of paper.

B. Plot fruit trees on a 30' check on the one acre orchard.

C. How many trees did you plot?

II. Instructor will evaluate.

FRUIT PRODUCTION

UNIT 1

JOB SHEET #1: Demonstrate Sharpening a Grafting Knife.

I. Materials Needed:

A. One grafting knife.

B. One rectangular stone

1. one side fine grind
2. other side rough grind

C. One leather strip

D. A wet paper towel

E. TM 5 - Knives and How to Sharpen Properly

II. Procedure:

A. Place wet paper towel on wooden bench or table top with stone on top of towel.

B. Put blade laying flat on surface of rough side of stones.

C. Tips of your fingers of one hand are placed near the edge of the blade while the other hand holds the knife handle.

D. Pull blade across the surface of the stone so that the cutting of metal is from cutting edge to the back of the blade.

E. You pull blade one way then turn blade over and push back until rough surface leaves the face of the blade flat from edge to back of blade.

F. Use fine side of stone same as you did with rough surface.

G. Draw knife blade across leather a few times to smooth the cutting edge.

III. What Have You Learned?

A. How to hold a grafting knife to sharpen the edge for cutting plant material.

B. Did you get your blade sharp?

FRUIT PRODUCTION

UNIT 1

JOB SHEET #2: Demonstrate How to Make a Whip-Graft.

I. Materials Needed:

A. A few limbs from a Lombardy Popular tree about ¼" in diameter.

B. Grafting knife

C. Grafting tape

D. TM 1 - Whip-Graft

II. Procedure:

A. Practice making the sloping that you will use on the scion. When you can make this cut with one pull of your blade and the cut is 1" to ¼" long you are ready to match surfaces.

B. Cut scion surface

C. Cut stock surface

D. Slip scion and stock together

E. Bind union with grafting tape

III. What have you learned?

A. Did the cut surfaces on your scion match the cut surface on the stock?

B. Did your instructor okay your work?

FRUIT PRODUCTION

UNIT 1

JOB SHEET #3: Grafting a Combination Apple Tree

I. Materials Needed:

A. One Yellow Delicious apple tree with four or five side branches about ¼" in diameter. (Bear Root tree)

B. One grafting knife

C. Grafting tape

D. Scion wood of four different apple trees.

E. One five gallon container

F. TM 6 - Combination apple tree.

II. Procedure:

A. Cut back side limbs so that they are 4 to 6 inches long.

B. Whip-graft four side limbs each with a different variety of apple. Whip-graft as on TM 6.

C. Wrap each graft with grafting tape and tag each limb by the name of the variety of apple you grafted.

D. Pot the tree in the five gallon container and set in cool place so the graft will union together.

III. What have you learned?

A. How to make a combination apple tree.

B. What is the difference in price from a Yellow Delicious and a 5-1 apple tree?

C. Did your instructor approve your work?

FRUIT PRODUCTION
UNIT 1
TEST

1. Match the terms on the left with their correct definitions:

_____a. Pome fruit
_____b. Malus
_____c. Pyrus
_____d. Drupe fruits
_____e. Prunus
_____f. Clone
_____g. East malling
_____h. Angers Quince

1. Fruit with an embedded core.
2. Stone seeded fruit
3. Apple
4. Cherry
5. A horticulture term used to denote specific cultivar that has been propagated asexually.
6. Pear
7. Clonal malus rootstock
8. Clonal pyrus rootstock

2. List three varieties of apples and three varieties of peaches recommended for Kansas.

Apples	Peaches
1.	1.
2.	2.
3.	3.

3. List four factors to consider in the timing of pest control

4. Name four factors to consider in choosing varieties.

5. Match the following pesticides with their correct characteristics:

_____a. Dormant oil spray
_____b. Kelthane
_____c. Malathion
_____d. Methoxychlor
_____e. Sevin
_____f. Thiodan

1. Used to control peach borers
2. Similar to Methoxychlor, may cause mite build-up
3. Controls codling moth
4. Phosphate effective against sucking insects
5. Used for mite control
6. Effective against scale insects

HORTICULTURE MECHANICS

UNIT 1

HORTICULTURAL HAND TOOLS

TERMINAL OBJECTIVE

Upon completion of this unit, the student will be able to define terms relating to hand tools, list maintenance tips for sprayers and spreaders, store and protect hand tools, identify, and name uses for hand tools, and demonstrate the procedure for sharpening shearing and cutting tools. This objective will be considered achieved by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, the student will be able to:

1. Match four terms pertaining to horticultural hand tools to their correct definition.
2. List three general tips for selecting hand tools.
3. List five general maintenance tips for sprayers before and after use.
4. List two general maintenance tips for sprayers that fail to build up pressure.
5. List three general maintenance tips for spreaders.
6. Select from a list those practices which are suggested for proper storage and protection of hand tools.
7. Identify eight hand tools and list at least one suggested use for each tool.
8. Demonstrate the procedure for sharpening hand tools which have shearing and cutting edges.
9. Complete Assignment Sheet #1 by compiling a list of hand tools needed in a horticultural enterprise of the student's choice.
10. Complete Job Sheet #1 by demonstrating the ability to correctly sharpen a shearing or grinding tool.

HORTICULTURAL HAND TOOLS

UNIT 1

INFORMATION SHEET

I. Terms and Definitions:

   A. Trowel - A small hand shovel.

   B. Cultivator - A tool used to remove weeds in gardens.

   C. Lopping Shears - A tool used for pruning branches from broomstick size and smaller.

   D. Pruning Shears - A tool used for pruning small limbs and flowers.

   E. Anvil - The piece on one blade of the shears with which the cutting blade makes contact to complete the cutting action.

II. Some General Tips for Choosing Hand Tools:

   A. Buy only the tools necessary for each job you intend to do.

   B. Buy the best tools you can afford.

   C. Choose tools carefully.

      1. Check tools for balance and weight.

      2. Check handle length and diameter.

      3. Make sure the grip feels comfortable.

III. General Maintenance Tips for Sprayers Before and After Use:

   A. Make sure tank is clean.

   B. Check hoses for cracks and breaks.

   C. Check seals for cracks and breaks.

   D. Clean screens and tips.

   E. If any parts are faulty, repair or replace.

   F. Store in a dry, protected area.

IV. General Maintenance Tips if Sprayer Fails to Build Up Pressure:

   A. Check to see if hand valve is functioning (closed).

   B. Check foot valve on pump.

   C. If plunger moves freely, disassemble pump and clean and spread leather on plunger.

V. General Maintenance Tips for Spreaders:

   A. Clean thoroughly before and after use.

   B. Periodically lubricate all bushings and gears.

   C. Keep all adjustment slides moving freely.

   D. Keep adjustment tables and guides clean and legible for easy calibration.

   E. Store in a dry, protected area.

INFORMATION SHEET

VI. Storage and Protection of Hand Tools:

A. Tools kept in good condition will prevent breakage.

B. All cutting edges should be kept sharp.

C. Remove all soil from the tool blade before storing.

D. By submerging the metal tool head in a bucket of oily sand, the head will remain rust-free.

E. Wooden Handles will last longer if stored indoors.

F. Keep wooden handles from drying out by rubbing them with linseed oil.

G. Hang tools on nails or pegs on a wall to keep them in good condition.

H. Most garden centers stock replacement handles for most popular tools with instructions on replacement.

VII. Names and Purposes of Hand Tools:

A & B. Long handle, round point, straight shank shovel - Irrigation.

C. Long handle, round point shovel - Digging and scooping.

D. Long handle, square point shovel - Leveling areas, shoveling dirt and gravel.

E & F. D-handle shovels - Moving soil and gravel and picking up litter.

G. Garden Shovel - Lighter than a regular round point, used for digging, cultivation and edging.

H. Transplanting spade - Transplanting shrubs and perennials.

I. Scoop shovel - Moving light materials and collecting litter.

J. 2½" Hoe - Light jobs in narrow spots.

K. 6" Hoe - Used for most work.

L. 8" Hoe - Used on driveways and walks.

M. Strawberry Hoe (7"x 1 3/4") - Use around shallow rooted plants.

N. Scuffle Hoe - Used for breaking crust and cutting seeding weeds.

O. Warren Hoe - Cultivating between plants, making furrows, make furrow with pointed end, cover seeds with the "ears".

P. Weeding Hoe - Hoe on one side, weed puller on other.

Q. Hedge Shears - Shaping hedges, shearing perennials, ground covers, and fading flower heads.

R. Lopping shears - For pruning branches, broomstick size and smaller.

S. Pruning Shears (Anvil type) - Small pruning jobs, flower and rose.

T. Pruning Shears (Hook and Blade type) - Small pruning jobs, flower and rose.

U. Long handle spading fork - Works well in hard soil.

INFORMATION SHEET

V. Short handle forks - Works well in crowded planting beds

W. Barn or manure fork - For moving garden prunings, long weeds, manure and compost

X. Cultivators - For breaking up hard soil around plants, not for deep spading

Y. Weed and grass cutters - For trimming lawns and removing large weeds

Z. Hand trowels - For small planting and transplanting jobs

AA. Asparagus or dandelion weeders - For lifting out tap-rooted weeds and for small cultivating jobs

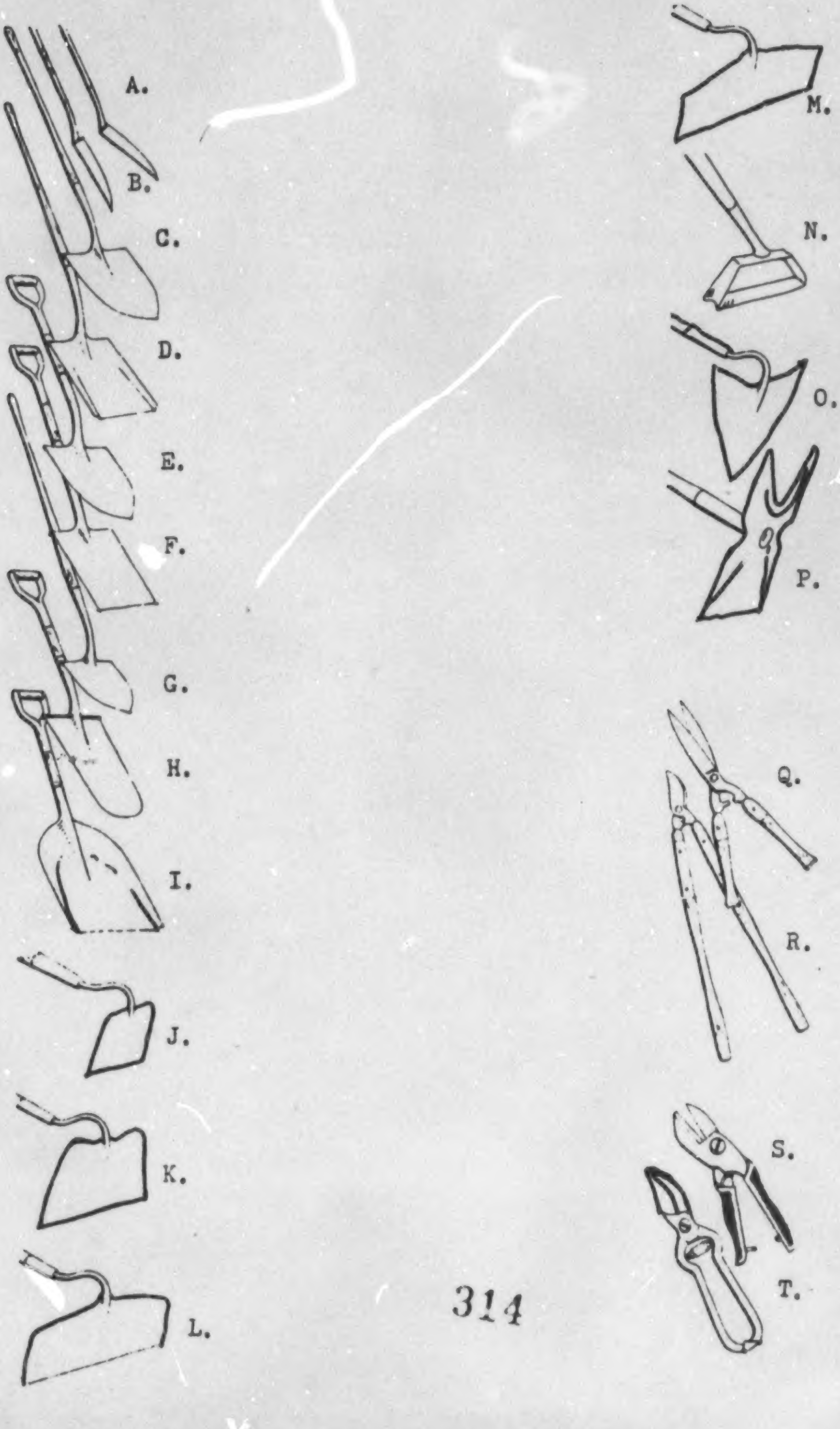
BB. Small hand cultivators and hoes - For close-up kneeling or sitting jobs, or planting on a hillside

CC. Matlock - Used for bushy weeds, invasive tree roots, and spreading ground cover

DD. Level head rake - Light lawn work, leveling seed beds, and making seed furrows

EE. Metal bow rake - Leveling soil or gravel, and collecting earth clods

FF. Lawn rake (Rectangular)
GG. Lawn rake (Fan Shaped)
For raking lawn clippings, leaves, and other material


A.
B.
C.
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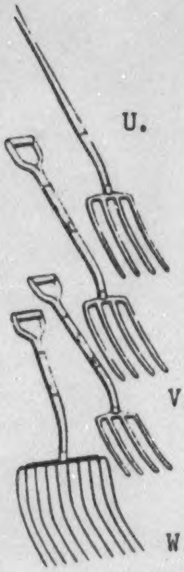
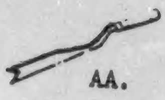


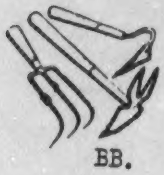
U.

V.

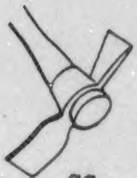
W.



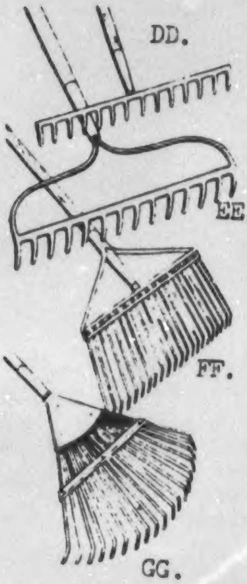
AA.



BB.



CC.

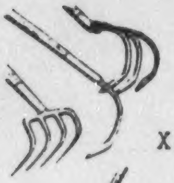


DD.

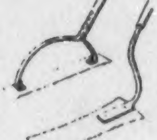
EE.

FF.

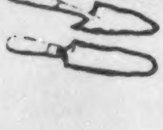
GG.



X.



Y.



Z.

HORTICULTURAL MECHANICS
UNIT 1

JOB SHEET #1: Sharpening Shearing and Cutting Tools

I. Tools and Equipment Needed

- A. Hedge Shears
- B. Grinding wheel (fine grit)
- C. Small flat file
- D. Vise
- E. Safety Goggles
- F. Oil Stone

FOR SAFETY'S SAKE

Always wear safety goggles when grinding to protect eyes from flying particles.

II. Procedures

A. Grinding

1. Place safety goggles over eyes.
2. Hold shears to grinding wheel so that blade is positioned as in Fig. 1.
3. Start grinding at the point, and move shears so that pivot moves toward the grinding wheel, maintaining the original bevel.
4. Apply a light, even pressure the entire length of the blade.
5. Inspect blade for sharpness and correctness of bevel at the end of each stroke.

   (Note: Do not close shears until the wire edge had been removed, refer to D. Removing the wire edge.)
6. Quench blade often to prevent over-heating blade and losing the temper.
7. With the other blade of the shears, repeat the above procedures.

B. Filing

1. You may be able to file shears without grinding.
2. Place back side of blade in vise as shown in Fig. 2.
3. Position flat file near the pivot of the shears and angled diagonally toward the point of the blade.
4. Maintain the original bevel with the file.
5. With even, steady strokes, move the file toward the point of the blade.
6. When desired degree of sharpness is achieved, reverse the shears, and file the other blade as described in the above procedures.

   (Notes Do not close shears until the wire edge is removed.)

JOB SHEET #1: Sharpening Shearing and Cutting Tools

C. Whetting

1. If shears are slightly dull, whetting usually develops a sufficiently keen edge.
2. Grasp one blade of shears, and position on oilstone as illustrated in Fig. 3.
3. Start whetting near the pivot and move shears diagonally, with the stroke ending on the point.
4. Repeat this process until the edge is sharp.
5. Reverse the shears, and repeat the process described in the above procedures.

D. Removing the Wire Edge

1. Lay the inside surface of the shears flat on the oil stone as shown in Fig. 4.
2. Lightly move shears diagonally across the stone, starting near the pivot and ending at the point.

E. Sharpening Cutting Edges

1. Use same procedures for shearing edges.
2. Shearing edges have greater angles than cutting edges as in Fig. 4.
3. Always maintain the original bevel when sharpening any tool.

JOB SHEET #1: Sharpening Shearing and Cutting Tools.

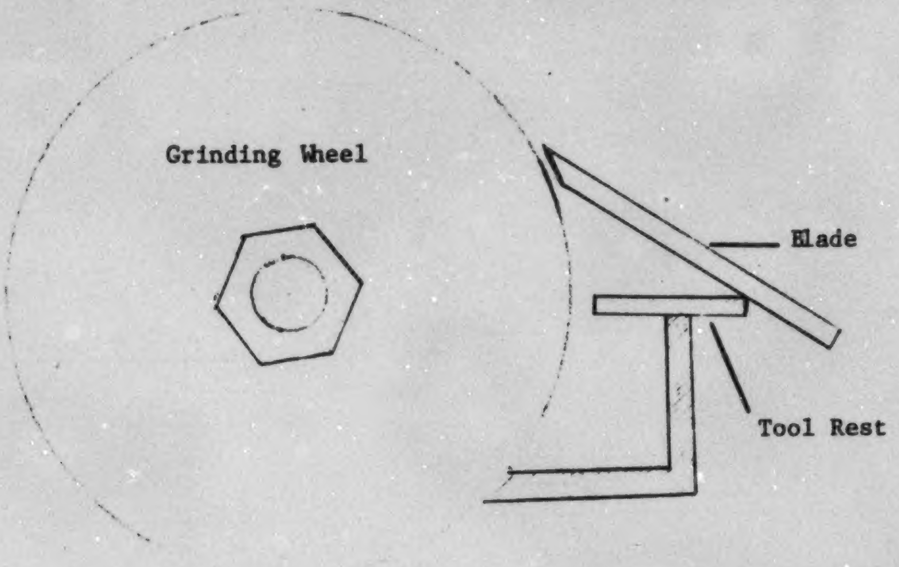

Grinding Wheel
Blade
Tool Rest

Fig. 1

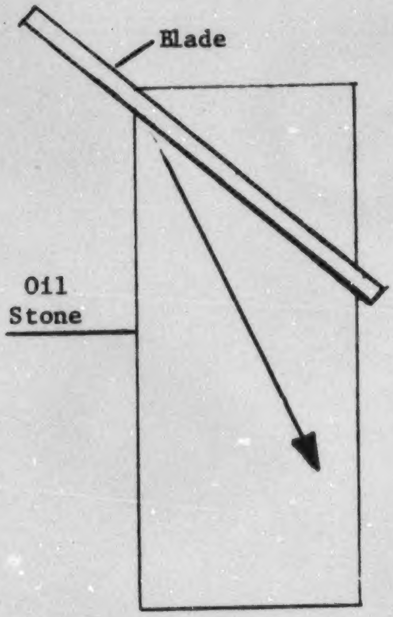

Blade
Oil
Stone

Fig. 2a

Top View with an oil stone

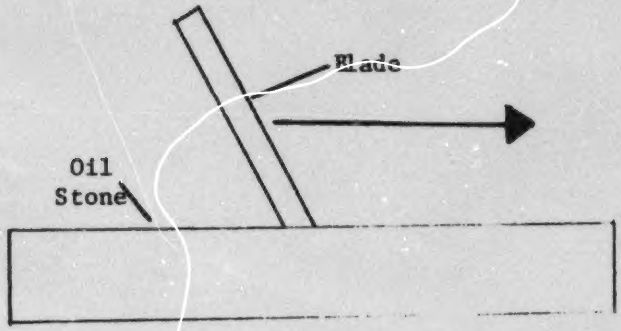

Blade
Oil
Stone

Fig. 2b

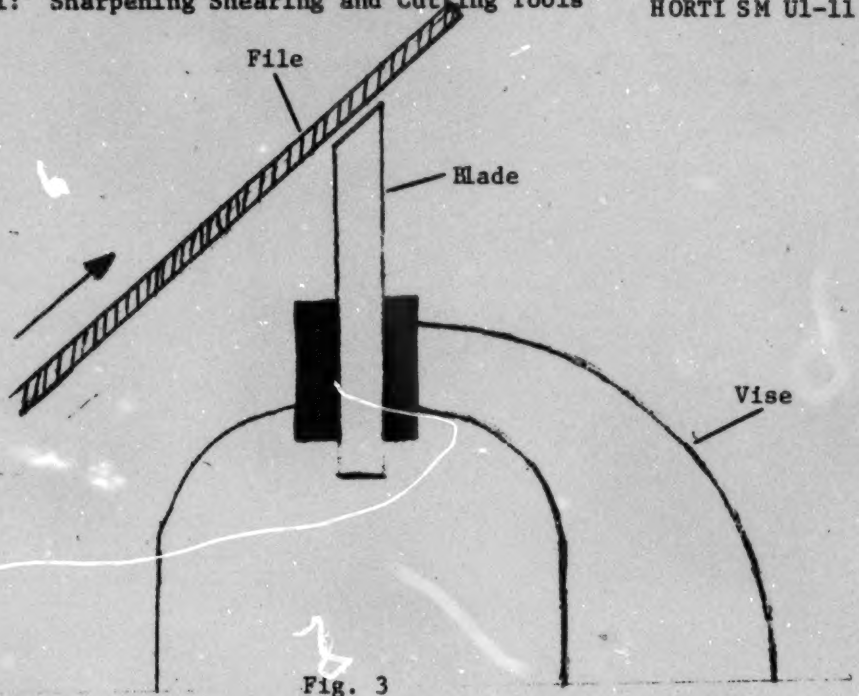
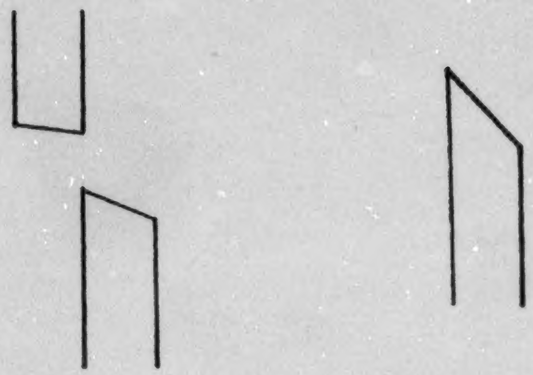

File
Blade
Vise

Fig. 3

Sharpening Blade with a File

Fig. 4



Shearing Edges

Cutting Edge

HORTICULTURAL MECHANICS

UNIT 1

ASSIGNMENT SHEET #1: Hand Tools Required in Horticultural Enterprises

The student will select one horticultural enterprise (garden, nursery, etc.) and compile a list of all the hand tools that would be needed in that area. Perform to the instructor's satisfaction.

Enterprise:______________________________

Tools needed:

HORTICULTURAL MECHANICS
UNIT 1
TEST

I. Match the term to the correct definition:

______1. A tool used for pruning small limbs and flowers.	A.	Cultivator
______2. A tool used to remove weeds in gardens.	B.	Lopping Shears
______3. A tool used for pruning branches from broomstick size and smaller.	C.	Trowel
______4. A small hand shovel.	D.	Pruning Shears
	E.	Anvil

II. List three general tips for selecting hand tools.

III. List five general maintenance tips for sprayers before and after use.

IV. List two general maintenance tips for sprayers that fail to build up pressure.

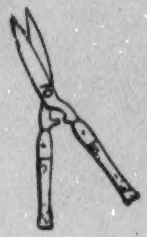
V. List three general maintenance tips for spreaders.

VI. Place an X in the blank in front of those practices which are suggested for proper storage and protection of hand tools.

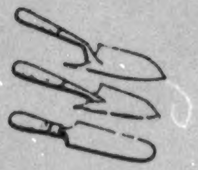
______1. Stand tools along the wall to keep them in good condition.
______2. Keep wooden handles from drying out by rubbing them with linseed oil.
______3. All edges should be kept sharp.
______4. Keep metal tools rust-free by submerging them in wet sand.
______5. Tools kept in good condition will prevent breakage.

TEST

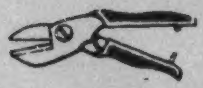
VII. Identify the following hand tools and list one suggested use for each.



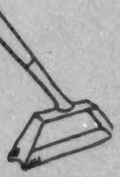
A



B



C



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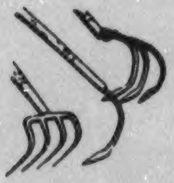
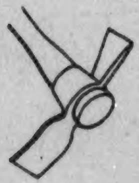
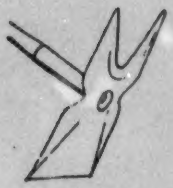


E



F



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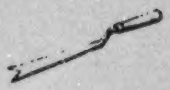

H

VIII. Demonstrate to the instructor's satisfaction, the proper procedure for sharpening hand tools with shearing and cutting edges.

IX. Perform Assignment Sheet I to the instructor's satisfaction by compiling a list of the hand tools needed in a horticultural enterprise.

HORTICULTURE MECHANICS

UNIT 2

SELECTING AND MAINTAINING POWER EQUIPMENT AND ACCESSORIES

TERMINAL OBJECTIVE

Upon completion of this unit, the student will be able to identify terms pertaining to power equipment, list rules for selection and safe operation of power equipment, develop a maintenance schedule, state general facts about adjustment, and perform jobs relating to maintenance and adjustment of power equipment. This objective will be considered achieved by scoring at least eighty-five percent on the test.

SPECIFIC OBJECTIVES

After completion of this unit, the student will be able to:

1. Match four terms pertaining to horticultural power equipment to their correct definitions.
2. List ten safety rules pertaining to the safe operation of power equipment.
3. List three factors to consider in selecting small power equipment.
4. List four steps in the development of a maintenance schedule for a piece of power equipment.
5. List four items that should be checked daily.
6. Discuss in a short paragraph, the method of preparing a piece of power equipment for winter storage.
7. State two facts about the adjustment procedures for various types of power equipment.
8. Demonstrate the ability to perform maintenance jobs on power equipment.

HORTICULTURE MECHANICS

UNIT 2

INFORMATION SHEET

I. Terms and Definitions:

A. Rotary Tiller - A power maching equipped with slow turning blades which loosen and blend the soil.

B. Lawn tractor - A power machine on which the operator sits. Used for mowing, leveling soil, hauling debris, etc., depending on the attachment used.

C. Vertical Mower - A power machine with revolving knives which slice through grass and thatch, to allow for better water penetration.

D. Power aerator - A power machine which removes small cores of soil, or otherwise opens the soil.

E. Scarifier - A power machine which scrapes off the top soil or debris or both.

II. Safety Rules:

A. Electrical Equipment

1. Before starting

a. Become familiar with equipment, safety rules, and operating procedures.

b. If equipment is not double insulated, use 3-wire extension cord. (2-wire with equipment ground)

c. Examine cord for cuts and frays.

d. Survey the area for dangers (wire fencing, posts, and heavy wood.)

e. Never operate in rain or in wet foliage.

f. Clear the area of children and pets.

g. Wear rubber-soled footwear.

h. Avoid wearing loose clothing.

i. Before plugging equipment in, be sure switch is in "OFF" position.

j. Never pick up equipment by the blade, use the handles.

2. While Operating

a. Keep both hands on handles.

b. Keep blade away from all parts of the body.

c. Avoid moving cord with hands while tool is running.

d. Switch tool off before switching hands.

e. Don't carry equipment by the cord.

f. Keep alert and braced for possible kickbacks.

INFORMATION SHEET

g. Avoid reaching too high, retain balance at all times.

h. Stand only on solid objects.

i. Keep excess cord away from tool, place it behind you.

j. Don't force tools, allow them to operate at their own rate.

k. Do not allow children to operate.

l. If you feel even the slightest tingle or shock, unplug the tool immediately and have it checked by a qualified repairman.

3. Storage and maintenance

a. Store tools in a dry place.

b. Disconnect tools for storage or adjustment.

c. Leave all repairs to a qualified repairman.

d. Keep tool sharp, clean, and lubricated.

e. Store tools out of the reach of children.

E. Small Engine Operated machines.

1. Before starting

a. Become familiar with the machine operating procedures, hazards and safety instructions.

b. Fuel up before starting - out of doors. Wipe up gas spills.

c. Make wheel height adjustments before starting.

d. Wear sturdy shoes and close fitting clothes.

e. Never allow children to operate.

f. Remove all debris from area which may cause injury.

g. Be sure machine is in neutral before starting.

h. Avoid mowing in wet grass.

i. Clear area of children and pets.

j. Be aware of hazards in the area, and work around them as cautiously as possible.

2. While Operating

a. Brace yourself and the machine while starting.

b. Operate at safe speeds.

c. Keep hands and feet away from all moving parts.

d. Follow operating procedures to insure safe operation of machine.

e. Never attempt to unclog or clean machine until the engine has stopped.

f. Never refuel while engine is running or hot.

g. Never leave machine unattended while engine is running.

INFORMATION SHEET

h. Always operate the machine across slopes, never up and down.

3. Storage and maintenance
    a. Always remove spark plug while repairing, to prevent accidental starting.
    b. Always keep blades and attachments tight.
    c. Check for leaky fuel lines.
    d. If machine has a key, remove it during storage.

III. Factors to consider when selecting small power equipment.

1. Buy only the equipment necessary for the work you intend to do.
2. Buy equipment which you will use regularly. (For very rare jobs, renting the equipment may be wise.)
3. Choose equipment which is the right size for the job.
4. Buy the most economical equipment available. (The least expensive is not always the most economical.)

IV. Maintenance Schedule for Small Power Equipment

A. Proper maintenance is required for warranty purposes.

B. Make a list of all the things that need checked periodically. (Consult owners manual)

C. Determine how often each item must be checked.

D. Determine procedure for maintaining each item.

E. When each item has been checked, record the date.

Example:

INFORMATION SHEET

Machine: Rotary Tiller

ITEM	When to Check	Date	Date	Date	Date
Change Oil	every 25 hrs.	9-27-76	10-11-76	3-18-76	
Gear Box	every 25 hrs.	9-27-76	10-11-76	3-18-76	
Belt	as needed	9-27-76	______	3-18-76	
Linkage	as needed	______	______	3-18-76	
Air Filter	every 25 hrs.	9-27-76	10-11-76	3-18-76	
Points and Condensor	as needed	9-27-76			

V. Daily Maintenance

A. Check oil level before you start the machine.

B. Remove any debris from around the cooling fins.

C. If any oil is spilled on the machine, remove it. (Helps prevent build-up of oily dirt.)

D. Remove grass, soil, or debris from the blade or digging mechanism.

E. Tighten any bolts which may be loosened by vibration.

F. If machine has grease fillings, one or two pumps of grease is usually sufficient.

G. Lubricate open chains or gears.

H. Keep shearing blades well lubricated.

VI. Winter Storage

A. Drain gas from tank and carborator.

B. Put several drops of oil in the cylinder.

C. Turn engine crankshaft several times in order to work oil around the rings.

INFORMATION SHEET

D. Loosen any belts to prevent damage.

VII. Adjustment Procedures

A. Various types of power equipment have varying adjustment procedures.

B. Consult the owner's manual for proper adjustment procedures.

HORTICULTURE MECHANICS

UNIT 2

JOB SHEET 1 - Preparing a Lawn Mower for Operation

I. Given a power lawn mower, the student should be able to prepare the machine for operation.

II. Things to check:

   A. Oil level
   B. Sharpness of blade
   C. Clean the under side of the mower
   D. Tightness of bolts.
   E. Gasoline level
   F. Adequate protective clothing worn by the operator.

   (NOTE: Anytime the gas level is checked, the oil level should be checked as well).

HORTICULTURE MECHANICS

UNIT 2

TEST

I. Match:

______A. Vertical Mower	1. A power machine which removes topsoil or debris or both.
______B. Rotary Tiller	2. A power machine with revolving knives which slice through grass or thatch to allow for better water penetration.
______C. Scarifier	3. A power machine which removes small cores of soil, or otherwise opens the soil.
______D. Power Aerator	4. A power machine with slow turning blades which loosen and blend the soil.

II. List ten safety rules pertaining to power equipment.

III. List three factors to consider in selecting small power equipment.

IV. List four steps in developing a maintenance schedule for a piece of power equipment.

V. List four items that should be checked daily.

VI. Discuss in a short paragraph the method of preparing a piece of power equipment for winter storage.

VII. State two facts about the adjustment procedures for various types of power equipment.

VIII. Demonstrate to the Instructor's satisfaction, your ability to perform maintenance jobs on a selected peice of power equipment.